Talent Identification and Carding in Canadian Track and Field:
Is Our System Empirically Supported?

by

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Abstract

The body of sport-science literature on talent identification (TI) suggests it to be a multi-factoral process aimed at targeting athletes with the potential for success in sport. The aim of this study is to provide a detailed examination of Athletics Canada's (AC) Athlete Assistance Program (AAP) policy, and the degree to which they incorporate TI literature into their practices. The second aspect of this study will give a detailed appraisal of AC's adherence to their own policy, and if they in fact, follow their own policy mandates in practice. This study is impactful, as it has the potential to create policy reform with respect to the manner in which AC carries out their funding practices, and the overall effectiveness of their athlete targeting practices.

Table of Contents

List of Tables

Chapter 1: Introduction

How many can say they truly excel in their chosen sport? If they can make this claim, is it a sport they sincerely enjoy, or that fans en masse attend on a regular basis? Commonly, there is a discordance between the first question I posed and the second. To qualify, often times it is not we who choose the sporting discipline that becomes the object of our devotion, time, effort, and sacrifice. Sport can also choose us. Just as we each have our own individual strengths and weaknesses, so to do various sporting domains require sport-specific skill sets. Every athlete is different, and is afforded unique, and often inimitable opportunities in sport that come as a result of the innate qualities he or she possesses. Such aptitudes are generally acquired through experiential processes in sport (training, effective coaching etc.), or bestowed upon them through heritable traits in their biological parents. Commonly, these traits dictate the course of athletes' careers, or if there is a career to speak of. Individuals are limited by the finite athletic potential they have, a variable that is mediated by the sport-specific talent they possess. With the backing of empirical research in sport science, the ability to pinpoint the unique talents of young athletes has great significance.

The recognition of sport-specific, advantageous traits is the essence of the sport science discipline known as talent identification (TI). Its importance transcends that of an athlete's goals and aspirations, permeating into governing bodies of sport, coaches, teams, and those with vested interest in various sporting domains. As athletes mature and transition into the professional ranks, talent identification becomes increasingly important, and is proliferated by the big

business of sport in the form of team revenues, advertising dollars, and the prospect of international sporting glory at the Olympic Games or world championship events. The latter might result in fame and financial rewards for athletes, but importantly, has the potential to establish nations as sporting superpowers, an accolade that many strive to hold. As such, national sporting organizations often dedicate substantial resources toward identifying and selecting athletes they deem to be worthy of evaluation. Of course, of particular concern here is efficiency within the system, and the ability to identify and target talented individuals as accurately as possible, thereby minimizing both financial and time costs. Talent identification, as a discipline, requires care, attention to detail, and the utilization of sport science research.

My master's thesis will focus on the Athletics Canada athlete funding system known as 'carding'. Through a careful analysis of AAP (Athlete Assistance Policy) documents, I will determine the degree to which the stated criteria athletes are funded by conforms to the dimensions of talent identification present in the literature. As well, my study will address the following questions: Are athletes targeted and funded simply on the basis of results, past results, reputation, or perhaps external factors unrelated to their individual qualities? Could it be that Athletics Canada's funding allocation is inherently flawed, and would be better-served to adjust their carding mandates according to present research on TI? Indeed, my aim is to make the reader think critically, and potentially, evoke policy change in the future.

It is my contention that AC's practices of athlete targeting and funding are a means by which they carry out talent identification, as according to Krasilchikov (2001) TI is a process by which current participants with at least some degree of experience in a particular sport are identified as possessing the potential to become elite players. Ostensibly, AC seeks to invest in future (or current) elite performers with the potential to succeed internationally. With this in mind, and in the absence of an official talent identification policy, they aim to target and cultivate talent in athletes through their Athlete Assistance Program (AAP) funding procedures. Though AC does not make an explicit claim that their AAP constitutes talent identification, the stated program policy mandates and funding criteria suggest that they, in fact, are carrying out talent identification according to its operational definition (seen above). Alternatively, nations like Germany have created policy initiatives that make direct reference to TI as part of athlete funding and development (Sam, 2012). AC's primary method for athlete selection is through AAP Policy, granting talented and deserved individuals access to system. It is the way in which TI in track and field is carried out in Canada.

Through a review of the relevant literature on this subject, I will provide depth to the multidimensional nature that is talent identification, and lay the groundwork for my study. TI has a rich history, and is rooted in domains outside the realm of sport that include educational testing, aptitude testing, and soldier assessment in the military. With the tumultuous political climate that followed the second world-war, nations seeking a rise to prominence in the international

sporting arena began to take a methodical, scientific approach to athlete selection. With the use of predominantly physically-based evaluation criteria, national sport organizations implemented measures and procedures that represent the first attempts at sport-specific talent identification, setting a precedent for increasingly sophisticated practices thereafter. Eastern-Bloc nations like the German Democratic Republic (GDR) and the Soviet Union revolutionized such practices, with the aim of supplementing communist propaganda with athletic success, affirming that their political ideology was a successful one. In order to keep pace, other nations were required to follow suit, and in time, began dedicating significant resources to TI practices (Dimeo, Hunt, & Horbury, 2011).

Ever-present in the field of sport-science is the idea that talent identification is not limited to physical and anthropometric measures, and in fact, has a prominent psychological component (Abbott & Collins, 2002; Regnier, Salmela, & Russell, 1993). In chapter-two I will outline the psychological factors that enable athletes to perform optimally under pressure-packed, or less than optimal situations, setting them apart from their peers. Generally, the body of work on TI suggests that an athlete's ability to mitigate symptoms of performance-anxiety is a key correlate to achieving maximal performance. In a related discussion, I will describe a number of psychometric protocols designed to measure psychological traits in athletes that best predict their ability to cope under stress. In general, it seems talent identification entails a dedication to measuring qualities in athletes that are covert, or less than tangible. This will be discussed in detail in chapter two.

Finally, as a method of data collection and analysis, I will use textual analysis to code relevant information in AC carding documents. It is through this process that I will define and conceptualize common themes in the text, thereby allowing myself to create a detailed description of funding practices. To account for potential anomalies in the current (2013-14) carding document, I have chosen to analyze and code 2 prior years of AAP funding policy. This will also enable me to track the progress of athletes during a three-year period, and to analyze a sample that is representative of carding practices over a number of years. Following coding and data analysis I will report my findings in written format, with rich descriptions of common themes and trends that exist in the documents. I believe this will allow the reader to gain a rich understanding of the documents, their similarities and differences, and most importantly, the nature of AC's funding practices.

Following the completion of the coding and analysis portion of my study, I will explore the practical application of the codes, that is, the degree to which AC operates in congruence with their own carding mandates. As such, I will include a separate chapter in this study (chapter five) that charts each athlete carded during the 2011-12, 2012-13, and 2013-14 carding cycles, and whether or not they conform to carding criteria I have coded in the documents. I feel this step will take the study further, and provide an inquiry into AC's practice of funding. Most importantly, and from an ethical standpoint, my aim is to investigate and provide into the query of whether those who receive funding are deserving of it.

   This study is significant for a number of reasons. First and foremost, it might have potential policy implications in the form of new and innovative means by which talent in track and field is construed. Should it be well received and deemed to be sound research, my aim is to contribute to a system I grew up in as a track and field athlete, and maximize its potential to grow. Additionally, there has yet to be research undertaken with specific attention paid to talent identification and athlete funding policy together (Abbott & Collins, 2004). Therefore, perhaps my thesis might set a precedent for future research in this domain, contributing to the streamlining of funding procedures in other sports or nations.

Chapter 2: Review of the Literature

Introduction

In congruence with a growing body of knowledge and specialization in sport science, effectively identifying talent in athletes can serve to enhance the elicitation of superior performances by way of pinpointing key correlates of athletic ability. In doing so, coaches, sport scientists and others with a vested interest in athletic talent will be able to act with greater efficiency. This means degrees of randomness or luck with respect to coming upon gifted athletes is, ideally, replaced with evidence-based planning or strategizing. Encompassed within such methods is a body of literature that aids in identifying characteristics in athletes may contribute to their sporting potential. Ostensibly, there may exist arbitrary and subjective methods of talent appraisal that need not be part of the conversation.

Talent Identification (TI) is a complex, multidimensional process (Krasilshchikov, 2011) and is regarded by sport governing bodies as an integral part of success at the international level. Correspondingly, an incentive exists for the primary stakeholders in sport to dedicate an abundance of resources to overseeing and growing talent identification models at the grassroots level (Abbott, Button, Pepping, & Collins, 2005). In this sense, research is generally driven by the competitiveness of sport, with athletic organizations vying to pinpoint and recruit young talent with urgency, and in the face of rival organizations acting on similar goals. Therefore, a crucial variable of consideration in athlete funding policy is effective, efficient, and empirically

supported methods of identifying talent in young athletes. This study will address both empirically-supported, and/or widely utilized methods by which talented athletes are identified. Correspondingly, through an analysis of the Canadian track and field talent identification and athlete-funding system, I intend to discern the degree to which TI protocols consider the full spectrum of traits found in the body of research that represent an effective working definition of talent or potential in track and field athletes.

In this review of relevant literature, a variety of dimensions of talent identification will be explored. These include the origins of scientific selection, the history of resource targeting, TI in non-sport-related domains, aptitude testing in education, psychologically-based dimensions of TI, psychometrics, performance anxiety management, and the regard for body morphology and anthropometrics. In sum, the aim of this proposed study is to examine the extent and efficacy by which government supported athlete financial assistance in Canada incorporates evidence-based talent identification strategies into their funding frameworks, or if perhaps they operate outside sports science research in favor of idiosyncratic, non-empirical, or traditional (and historically accepted) funding protocols. In short, my aim is to determine the extent to which talent identification in Canadian track and field and its corresponding funding frameworks are evidence-based and represent an empirically supported talent identification paradigm. Chapter 2 will provide a breadth of background information on the history of TI, and contemporary protocols that have been implemented to identify and select talented individuals across a wide variety of

domains, particularly sport. To follow, I will propose an appropriate methodological paradigm through which I will gather and analyze data, thereby examining talent identification with the utmost rigor.

Talent as a Construct

To detail a conceptual framework for talent identification, it is first pertinent to provide a definition for it as a construct within the realm of sport science, and how researchers have come to view its utility (or futility) over time. A practical working definition of TI in athletes appears in research conducted by Brown (2001) and St-Aubin and Sidney (1996), who proposed TI to be a methodological process of predicting sport performance over various periods of time by obtaining information on prospective athletes' physical, physiological, and technical abilities, either alone or in tandem with measures of psychological aptitudes. This definition not only accounts for the innate physical attributes of future elite athletes, but suggests the role of a psychological component in talent identification. Krasilshchikov (2011) provided a much simpler definition of TI, describing it as a process by which current participants with at least some degree of experience in a particular sport are identified as possessing the potential to become elite players.

Correspondingly, Abbott et al. (2005) and Vaeyens, Gullich, Warr, and Philippaerts (2009) defined TI as the continual attempts by researchers to find effective methods targeted at pinpointing elite performers by way of identifying individuals who have the potential to yield extraordinary results in sport. This can be achieved through a complex process involving assessment of performance

potential resting on objective physical skills (results, physical abilities, etc.) and morphological characteristics of an athlete. Historically, research in the field of talent detection and identification has placed a marked emphasis on these physical and morphological variables, a kind of genetic determinism in TI that has (and currently does) dictate its typical operational methods (Davids & Baker, 2007). The role of natural, genetic ability in sport has been said to be a prevailing factor in the elicitation of great performances, and was first identified in a non-sporting context by Sir Francis Galton (1884). Galton suggested that in accounting for variables of nurturance, namely resources available to an individual (for the purposes of this review this might include effective coaching, parental support and proper facilities), nature (or genetics) prevails enormously over nurture (or environment) as long as an individual's environment is not significantly devoid of resources relative to another. Though slightly dated, Galton's approach has transcended time as research suggests the vast majority of TI procedures undertaken are focused primarily on morphological and anthropometric characteristics of athletes (Gabbett, Georgieff, & Domrow, 2007; Vandendriessche et al, 2012).

Conventionally, TI has placed a great deal of emphasis on current, age-related performances in athletes during discrete periods in their athletic development. This most typically occurs with respect to performance marks attained in their chosen sport, relative to athletes in their cohort (Abbott & Collins, 2002; Regnier, Salmela, & Russell, 1993). Essentially, the determination of young athletes as 'talent rich' or 'talent deficient' is contingent on achieved

competition results relative to peer athletes in the same age range. Studies from Bloom (1985) and Côté (1999) expanded on this notion, finding that talent in young athletes is often rendered untapped due to external factors like lack of effective coaching, parental involvement and desire of the individual to succeed. The idea here is that TI is a primary process that is integral in cultivating and recruiting young talent, yet the development of an athlete is a complex and dynamic process rather than a discrete, all or nothing endeavor based solely on native ability (Van Tassel- Baska, 2001). Relevant literature suggests that TI has, in the past, been seen as a multifaceted, interdisciplinary process. It includes the scientific method, direct observation, and the utilization of so-called 'experts' in an attempt to select young athletes with the greatest efficacy. Such practices are not only reflected in present day literature and practice, but originated when the talent identification paradigm was in its infancy.

The History of Aptitude and Talent Identification

As a scientific discipline in sport, talent identification has a relatively recent history. The utilization of TI and quasi-scientific method has its roots in Eastern Bloc nations, particularly the Soviet Union and the German Democratic Republic (GDR), who for political and ideological reasons were seeking to gain prominence through international sporting success (Dimeo, Hunt, & Horbury, 2011; Gerrard, 2008). In line with a tumultuous political climate in the post-World War Two era, the ultimate end-game for both nations in their attempts to attain athletic glory was the flagrant promotion of socialist policy. In an effort to achieve sporting supremacy, the Soviet Union employed a somewhat rudimentary

practice. Basic fitness-testing, and a heavy reliance on *natural selection* in identifying talented individuals laid the necessary groundwork for talent laden pools of athletes (Krasilshchikov, 2011). For their purposes, the natural selection of athletes meant a casual and frequent circulation of talent in the way of a 'revolving door' practice, meaning a consistent influx of extraordinary numbers of young athletes perpetually strengthened the system. The bottom few percent, or the weakest of the athletes would, in turn, be dismissed periodically to make way for new and potentially stronger bodies. Though vastly inferior to contemporary practices of TI, the Soviet system represented the first true science-based talent identification paradigm. Their system employed scientific principles in methodically selecting athletes based on crude fitness measures, and correspondingly, expelling inferior athletes from the talent pool in favor of new and potentially superior individuals.

The German Democratic Republic innovated a talent identification process just as the Soviet Union did, however theirs was only similar in ideological motives (demonstrating superiority over western nations including West Germany) and relied heavily on empirical research and technological innovation (Krasilshchikov, 2011; Gerrard, 2008; Cole, 2000). The GDR's methods were innovative as they represented the first true attempt at an adherence to technological innovation as a cursory method of TI. The East German nation enacted a policy that can be likened to a kind of *scientific socialism* (Jarvie, 1984) where the State Committee of Physical Education and Sport developed new and innovative ways to identify talent and strengthen athlete development through

mass participation in sport. This served to create an even richer talent pool as youth sport participation was considered mandatory, with dissention seen as suspicious or anti-nationalistic. Rather than natural selection, the GDR's TI protocol was deeply embedded in *scientific selection*, heavily biased toward superiority in basic physical, kinesthetic, and motor qualities, as measured by laboratory technologies of the time. Such methods included physiological test batteries like skeletal muscle biopsy, an invasive procedure aimed at identifying athletes' fast and slow twitch muscle proportions, and therefore their ability to produce fast and powerful movements (Gerrard, 2008, Shepherd, 2013). Young athletes subjected to these treatments were typically selected based on outward physical ability, taken away from their families to special academies of sport, and subsequently placed in their 'appropriate' sporting discipline based on their unique physical capabilities. Additionally, athletes deemed worthy of further investment were administered performance-enhancing drugs, some of which carried serious future repercussions including severe health consequences and stripping young athletes of their identities (Dimeo et al., 2011). These substances, generally derived from the male hormone testosterone, provided athletes (especially females) with undisputed physical superiority and the capabilities to produce athletic feats that were unachievable without pharamacological aid (Franke & Berendonk, 1997).

To undertake such endeavors, the GDR government adopted a radical top-down approach, with the creation of sporting mandates generated by high-ranked government officials, and trickling down with high compliance to sports

physicians, scientists, and expert coaches (Gerrard, 2008; Franke & Berendonk, 1997). This entailed a high degree of congruity between government mandated protocols toward talent identification and athlete development, and the execution of such practices by coaches, trainers and sporting organizations. Additionally, the Stasi (GDR secret police) acted as a safeguard to the efficiency of the system, with dire repercussions in the form of imprisonment, corporal punishment or death (Dennis, 2012). Indeed, historical records indicate that the origins of talent identification in sport are deeply rooted in conventional practices adopted by Eastern Bloc nations in the name of ideological motives, nationalism, and international prestige. These endeavors were carried out under the assumption that success in the sporting arena would serve to legitimize their respective ideologies and political practices that were often perceived by the western world as inherently wrong, immoral, or unnatural (Cole, 2000; Dennis, 2012).

It is clear these nations seem to have laid the groundwork for contemporary methods of TI in sport, as their talent identification models have been widely utilized by nations possessing the means to do so. Beginning in the 1980s, Great Britain initiated a sporting mandate that was to model the GDRs talent identification and development protocols, particularly in sports like track and field where there was a heightened public interest (Collins & Bailey, 2013). This was carried out because of the widespread success of East Germany's TI protocols, their attention to detail, and scientific basis for their practice. Of these practices, early detection of young talent was seen by the British sporting system as a key component in identifying talent with the greatest efficacy, a central

practice in the GDR system. Certainly, early detection in TI has not been limited

to the sporting arena, nor did empirically-based methods originate there. The

identification of young talent has had a rich history in other, non-sport related

domains that preceded sport-related practices. These include the military

(adopting similar physical TI models as in sporting disciplines), and intelligence

and aptitude assessment in educational settings.

Talent Identification in Educational Settings

The term talent identification, by definition and construct, is somewhat

inaccurate when applied to domains such as educational or vocational capabilities.

In real-world settings, the term *aptitude* is more appropriate. Aptitude can be

described as a demonstrated potential capacity to perform a specific task or series

of tasks in a competent fashion (Russo, 2011). Cronbach and Snow (1977)

provide a slightly more detailed definition of aptitude as "any characteristic of a

person that forecasts his/her probability of success under a pre-prescribed set of

conditions" (p. 6). A further delineation between talent and aptitude is posed by

Lohman and Foley-Nicpon (2012), who described aptitude as inclusive of talent,

but also requiring the presence of supplemental personality characteristics that are

crucial for successful learning in a particular environment. Inherently, TI models

seem to forecast innate potential for tasks in a competitive setting relative to

others, whereas aptitude serves as a general mechanism by which the potential for

efficacy of a task can be assessed. As such, an individual's aptitude, or domain-

specific potential for success, holds predictive value and utility across a variety of

circumstances. Predictably, there exist a plethora of instruments and methods aimed at assessing, measuring, and predicting aptitude.

Of these assessment tools, the Stanford-Binet Intelligence Scales (and its predecessor the Binet-Simon Intelligence Scales) represents the first true successful attempt at creating an intelligence test that could be adapted and normed to fit specific populations (Janzen, Obrzut, & Marusiak, 2004). As mandated by a French government commission to identify and enrich gifted children, the Binet-Simon Intelligence Scales (and later the Stanford-Binet) were designed to have predictive value, ideally placing gifted individuals in programs suited to nurture their unique intellect (Santrock, 2008). Though case-studies and detailed examinations of potentially gifted youngsters might have yielded more reliable results, the creator of the Binet-Simon, Alfred Binet, supported the notion that it would be unduly cumbersome to conduct detailed assessments of the vast number of youth being tested (Santrock, 2008) . Thus, the Binet-Simon could measure talent and aptitude in youngsters while simultaneously reducing overall program costs, and determine the appropriate track for individuals who demonstrated heightened abilities and performed well relative to their peers.

The grassroots movements in academic talent identification through psychometric tests grew and gained legitimacy through field testing in the military and OSS, and during the mid-20th century, became the standard for identifying, categorizing, and nurturing intellectually gifted youth (Wachtel, 1976; Anastasi, 1988; Cronbach, 1990). Not surprisingly, there exists a vast body of literature relating to the predictive value of cognitive assessment (IQ-testing),

and the examination of whether or not early IQ scores accurately predict real aptitude (or talent), and success in adulthood. Brown and Reynolds (1975), in an examination of young adults enlisted in the Korean War, found a significant positive relationship between overall IQ score and yearly income following their military service. Correspondingly, Herrnstein and Murray (1994) found that few individuals with high IQ scores live in poverty, supporting the notion that high IQ is not only a strong predictor of life achievements, but an absence of failure. A true testament to the relationship between IQ score and aptitude/success was examined by Zagorsky (2007), who in a study of over 7000 baby boomers, found that a one point increase in IQ score corresponds to approximately a $364 increase in yearly net income. As such, intelligence has been seen as a viable predictor of aptitude and performance potential, as it serves to strengthen individuals' earning potential and acts as a protective factor against poverty.

In addition to psychometric instruments designed to assess IQ, a number of testing correlates have been used in educational settings to identify aptitude and talent in students. One such longitudinal study founded by Julian Stanley in 1971 (later to be spearheaded by Camilla Benbow and David Lubinski (2000)) utilized data from the Study of Mathematically Precocious Youth (SMPY) that was designed to track 7th and 8th graders representing the top 1% in mathematical ability. The SMPY found a significant relationship between mathematics scores in state sanctioned compulsory achievement testing and subsequent academic success. This included proportions of individuals obtaining bachelors and doctoral level distinctions (90% and 25% respectively), as well as vocational successes and

rank, especially when the subject demonstrated a particular interest in math or the sciences (Achter, Lubinski, Benbow, & Eftekhari-Sanjani, 1999). Lending further support to this relationship are findings from Lakin and Lohman (2011) that highlight a significant relationship between both verbal and quantitative reasoning measures on achievement tests and subsequent success in academic endeavors. Effective talent-identification procedures in education have been shown to minimize the proportion of students whose subsequent performance indicates that they were mistakenly included in or excluded from the program, thus, they serve to nurture heightened student intellect as well as maintain greater efficiency in the system (Lakin & Lohman, 2011).

Though a multitude of testing instruments have been developed during the 20th century, little has changed in terms of testing content, and moreover, the idea that each instrument (as was the case with early intelligence and aptitude tests) is designed to measure and quantify a so-called *g-intelligence*, or overall intellectual ability (Terman, 1954; Haynes, Heiby & Hersen, 2003). The administration of these instruments is done under the pretense of a degree of construct validity, that is, that test results yield an intelligence quotient (IQ) or achievement score that accurately ranks individuals intelligence relative to their peers, and truly represents and measures aptitude or potential (Loevinger, 1957). Running counter to this notion is the examination of both construct and internal validity of intelligence tests, which indicate such psychometric tests place a premium on academic sharpness and ability, and exclude real-world intelligence as it is often intangible (as was the case with OSS recruit selection in the following section)

and therefore, largely immeasurable by these conventional methods (Sternberg & Wagner, 1986; Sternberg, Wagner, Williams, & Horvath, 1995). As such, with the emphasis on academic achievement creating a bias toward scholarly individuals, intelligence testing as a measure of real-world aptitude can be considered an empirically-based yet incomplete (or perhaps imperfect) method of determining aptitude. The objective soundness in identifying intellectual parameters of talent across populations is at least partially confounded by this academic achievement-based skew in intelligence testing, with these procedures so commonly used in the absence of alternative methods of assessing intellectual or vocational aptitude (Lohman & Gambrell, 2012). Interestingly, psychometric testing is not exclusive to the measurement of scholarly and academic aptitude, and has been firmly established as an assessment tool across a wide variety of domains. One such area where intelligence measures have had a great deal of utility is the military, where they have served to stratify and categorize military personnel and potential enlistees based on measured aptitude.

Talent Identification in the Military

The innovation of the Binet-Simon, and later the Stanford-Binet, gave rise to a variety of psychometric tests engineered to quantify individuals' intelligence and potential, and formed the basis for the field of *personnel psychology* (Super, 1949; Sternberg & Kaufman, 2006). Levy (2010) gives a succinct description of the modern function of personnel psychology as being focused on the selection and evaluation of employees, and later, job performance and satisfaction appraisals (Levy, 2010). A pertinent and early example of this came in the form of

the Army Alpha and Army Beta tests, designed to measure soldiers' intellectual capacities and appropriate roles within the US military during the first world-war (Jones, 2007). After test norming and selection protocols, both tests were approved for military use with the purpose of (a) Delineating the mentally incompetent from the competent; (b) Classifying soldiers according to their intelligence or aptitude; and correspondingly (c) to assist in assigning responsibilities and rank according to measured intellectual capacities (Jones, 2007). The development of the Army Alpha and Beta tests are regarded as a benchmark in the field of psychometric testing as their practical implications served to effectively discriminate aptitude and overall intelligence levels across military personnel. This practice enabled a greater efficiency of soldier assignment on the basis of demonstrated ability.

Military aptitude testing protocols continued to evolve during the inter-war period, yielding new, innovative and more numerous testing methods undertaken with great precision and reliability (Super, 1949; Jones, 2007). Such methods took the form of physical and psychological aptitude testing in gathering personnel to be employed in the OSS (the Office of Strategic Services), a branch of the US military formed with a mandate to coordinate espionage activities behind enemy lines (Jones, 2007). As the predecessor to the CIA, the OSS was mandated to identify enlisted US military soldiers with superior reasoning ability, language skills, capacity to retain pertinent information, and a level disposition that required composure under highly stressful conditions in enemy territory (Hahn, 2002). During the OSS selection process, a total of roughly 13,000

individuals were assigned duties (Jakub, 1999; Katz, 1999) based on the selection criteria, and with each soldier's unique skill set, thusly contributed to the American war effort in non-combative scenarios. As an organization, the OSS during world-war two served to elaborate on past aptitude and assessment procedures for soldiers in world-war one by including additional criteria less related to performance-intelligence measures. This was carried out by a heightened focus on tangible and transferable espionage traits they deemed instrumental for soldiers behind enemy lines. Just as these traits have been shown to carry utility and usefulness in the military, so too have psychological characteristics been shown to be key correlates of talent and performance measures in the sporting realm.

Psychological Correlates of Talent

As it is evident that cognitive assessment strategies and psychometrics have proved efficacious in identifying current and future academic aptitude, so too are psychological variables a widely utilized predictor of performance measures, particularly in sport. A broad range of psychological factors in athletes have been identified as both beneficial and detrimental to athletic performance, and thus, a great proportion of research in the field of performance psychology has been centered around first identifying talented athletes based on current performance measures, then working backwards to discern the psychological variables and strategies such athletes employ to elicit peak performances (Abbott & Collins, 2002; Regnier, Salmela, & Russell, 1993). This is often achieved through psychometric protocols that assess an athlete's current state of being,

failing to account for past behaviors and performances that might act to strengthen the reliability of such correlates. One such protocol that has been widely used as a TI strategy is the Athletic Coping Skills Inventory (ACSI), designed to assess coping with adversity, coachability, concentration, confidence and achievement motivation, goal-setting and mental preparation, peaking under pressure, and freedom from worry. In a study of professional baseball players, Smith and Christensen (1995) found that items listed in the ACSI to be a significantly greater predictor of success than physical attributes. Additionally, a number of psychological variables have prevailed in the literature as being relatively reliable predictors of talent in athletes. These include determination and persistence (Bloom, 1985; Renzulli, 1986), motivation (Singer & Orbach, 1999; Ward, Hodges, Williams, & Starkes, 2004), and autonomy (Schoon, 2000), all of which have all been suggested as factors necessary for the attainment of excellence. This process is facilitated by the nurturance of specific skills and enabling athletes to invest the requisite time to practice, staying committed to the development process. As trait-based characteristics, such variables are stable, and should persist through the careers of athletes, cultivating and facilitating dimensions of talent in their chosen sporting endeavors (Cellar et al., 2011). Morris (2000) posed a similar argument, positing young athletes who possess the same psychological characteristics as those of elite performers will retain such characteristics, and consequently become successful elite adult athletes.

In sport psychology literature, it has been generally agreed upon that athletes possess a finite amount of innate ability that can be translated into

varying degrees of talent, often contingent on psychological determinants unique to the individual (MacNamara, Button, & Collins, 2010). A domain first explored by Kamin et al. (2006) in a study of TI in music, the idea that psychological characteristics like attitude, emotion, and desire serve to aid individuals in realizing their potential has been a widely utilized talent identification method in sport. Such characteristics, referred to as Psychological Characteristics of Developing Excellence (PCDEs) are characterized as trait-based attributes, and thus, are stable and pervasive throughout an athlete's career. This enables young athletes to maximize their athletic potential and develop a sophisticated skill set specific to their sport. A number of other important PCDEs are common to the literature on performance psychology, namely competitiveness, commitment, self-belief, and the ability to cope under pressure. Such traits are seen as heritable (Williams & Reilly, 2000), that is, genetically-based attributes that are generally stable, influenced by environmental triggers. In essence, optimal levels of these traits allow talent in individual athletes to come to its full fruition, and can be inherited from parents who possess similar psychological strengths and weaknesses.

In terms of track and field athletes, the body of literature on psychological correlates of peak performances suggests a number of dispositional characteristics that enable athletes to train and compete at an elite level. In a study of talent potential in adolescent distance runners, Kruger. Pienaar, Du Plessis and Van Rensburg (2012) found coping ability, concentration, and confidence to be critical traits associated with talent in young runners, delineating average or 'non-elite'

runners from the elite. Additionally, their findings suggest that in comparing talented and non-talented groups, the level an athlete has achieved in sport is a strong predictor of positive individual psychological traits across 7 of 8 measurements. These include adversity, pressure, goal-setting, concentration, confidence, coachability and coping ability, each of which differentiated the two groups (semi-serious/recreational athletes vs. serious/competitive athletes) significantly. In a related study, Dale (2000) found lack of confidence to create perceived obstacles toward success, cultivating self-doubt and self-defeating cognitions. It seems talent has been, and can be strongly correlated to individual, mutually exclusive psychological traits, and can exist relative to the level at which individual athletes compete.

Importantly, psychological characteristics deemed to be beneficial to athletes have been shown to have predictive value, thereby legitimizing conventional methods of talent identification carried out through the analysis of psychological strengths and weaknesses (Abbott & Collins, 2004). Lending support to this notion are studies by Gould, Eklund, and Jackson (1992), and Orlick, Hansen, Reed, and O'Hara (1979), who each found that skillfulness in the form of competitiveness, commitment, imagery, and goal-setting yield a greater likelihood of international sporting success. For the purposes of both studies, the dependent variable (outcome variable) was whether or not athletes won a medal at the world championships or Olympics. Ostensibly, the predictive value of such measures carries implications, as the stakeholders within the sporting system (those who's power is derived from the resources or authority they wield) are best

advised to allocate scarce resources to identified athletes with the purposes of aiding and developing talent (Anshel & Lidor, 2012). Generally, the primary concerns of stakeholders in the sporting hierarchy are monetary and success of the organization, thereby creating an environment of accountability for individuals working within the system. Additionally, sport governing bodies must allocate scarce resources to identified athletes, where often times, psychological correlates of talent are neglected, and are potentially not a primary focal point (Anshel & Lidor, 2012). To achieve such an outcome with precision, current research suggests psychological variables need be attended to, defined, and quantified in order to paint a complete picture of the potential talent athletes possess.

One such method that has been considered instrumental in identifying psychological correlates to athletic talent has been the administration of retrospective self-report questionaires to elite athletes (MacNamara, Button, & Collins, 2010). Studies of this nature have allowed sports scientists to gain insight into psychological factors that elite athletes deem to have contributed significantly to their sporting success. This is largely based on an appraisal of their strengths and weaknesses during their development and maturation in sport (Lidor & Lavyan, 2002). Studies like these neutralize the cumbersome nature of longitudinal studies, reducing financial and time costs in the process. Notably, retrospective self-report studies carry inherent limitations including response bias, truthfulness, reliability, and false memories (Patton, 2002), which are often offset by parental involvement in the study to enhance response reliability through retrospective recall. MacNamara, Button, and Collins (2010) implemented

precisely this type of experimental design, finding that psychological strengths were particularly salient when athletes recalled factors that enabled them to develop sport-specific talents and maximize the potential for success. Correspondingly, the importance of athletes' physical attributes was significantly de-emphasized in responses to the questionnaire, calling to attention the importance of psychological variables as crucial to the identification of talent potential in young athletes. Though this method does not necessarily represent a true form of talent identification, it aids in the identification of psychological variables (through retrospective recall) that act as precursors to the formation of talent, and thus, contributes to the predictive value of psychological correlates. Of course, the imperfect nature of retrospective recall can certainly create confounds in these measures. Thus, self-report questionaires should be accompanied by some form of supplementary data to be considered reliable.

A variety of different methods have been used to assess psychological variables that predict talent in athletes. In a discriminant function analysis of psychological characteristics that predispose long-term success in sport, Deaner and Silva (2002) found future athletic talent to be positively correlated with self-confidence, as did Andersen (1976) and Vealey (1985, 2002). Correspondingly, ambition (Mahoney, 1989), self-motivation (Mahoney, 1989), emotional stability, and enthusiasm (Missoum & Laforestrie, 1981) have been found to be significant, especially when considered in tandem. Therefore, in taking into account the summation of these psychological traits in athletes, results indicate a strong relationship between possessing all traits, and the consideration of an athlete as

'elite'. In a similar review of relevant literature, Hahn (1990) identified a combination of traits that predict future talent in athletes. Just as with Deaner and Silva's study, self-motivation and self-confidence were found to be strong predictors of future athletic talent, not-withstanding stubbornness, goal-orientation, and anxiety control. Further, a study produced by Haskel (1983) examined psychological variables in a similar fashion using this summative approach, and found that possessing self-confidence, goal-orientation, self-motivation, enthusiasm, and self-control has a profound effect on future sporting success and talent. These studies, inclusive of Kruger et al. (2012) and their work with track and field runners, suggest that self-confidence, a common finding in each study, to be a key predictive variable in assessing psychological talent dimensions in young athletes. In sum, psychological traits can certainly be said to carry utility in identifying talent in athletes, and when considered in clusters, can act as strong predictors of future athletic success. Unfortunately, such traits are difficult to identify and assess through simple observation, and often require standardized assessment procedures. This type of concern has led to the development of a number of psychometric protocols designed to measure and quantify psychological traits deemed to be instrumental in athlete sport performance.

Psychometrics

Historically, the use of psychometric tests has aided in providing efficient and accurate data collection in assessing psychological variables related to talent. A widely utilized method of TI along psychological bounds is the aforementioned

Athlete Coping Skill Inventory (ACSI-28) developed by Smith, Schutz, Smoll, and Ptacek (1995), and developed to identify the sport-specific psychological skills of individual athletes (Kruger, Pienaar, Du Plessis, & Van Rensburg, 2012). The ACSI is a psychometric questionnaire with 28 items with 7 subscales designed to determine an athlete's ability to cope with adversity, peaking under pressure, goal setting/mental preparation, concentration, freedom from worry, confidence and achievement motivation and coachability. The inventory assesses athletes on a 4-point Likert scale of 0 (never) to 3 (almost always) allowing for a user-friendly questionnaire that claims to provide an accurate, subjective self-appraisal of the presence or absence of the psychological constructs on each subscale. Predictably, this type of self-report measure carries an experimental confound as tested athletes might feel inclined to present themselves positively in the face of foreseeable internal scrutiny from team officials or coaches (Smith et al, 1995). Paulhus (1986) has suggested that this variety of socially desirable responding is anchored in two potential capacities: *Positive self-presentation* (impression management) and *self-deception*. Positive self-presentation, commonplace in most psychometric protocols, refers to the conscious effort to project a positive image to others that is not in accord with the individual's own self-concept; it is, essentially, "faking good, and represents a type of malingering (lying) that exists in psychometric testing (Leary & Kowalski, 1990). Self-deception, for the purposes of this study, refers to the inclination of an athlete to establish and maintain a truthful, highly optimistic self-image, typically for the (often unconscious) purpose of maintaining a strong ego or self-image. In this

case, self-deception might serve as a means to an end, as the focal point for competitive athletes usually coincides with some degree of optimal performance or competitive results. In sum, when considering the efficacy and validity of psychological testing, an important consideration is the degree to which an athlete can engage in thoughtful, truthful introspective thought to determine his or her current psychological state with respect to sport.

An important caveat to this discussion is the prominence (or lack thereof) of psychological models of TI, as well as talent development, in models designed to assess and target potentially superior athletes. Though the literature suggests psychological variables play a crucial role in the blossoming of athletic talent, Kunst and Florescu, as early as 1971, found psychological factors to contribute a mere 15% to talent identification and development models at the time, a significant disjoint considering their finding that psychological constructs account for over 50% of the variance in development efficacy—the ability to progress effectively. Despite the recent growing body of literature supporting their importance, there is still little emphasis placed on psychological variables in athletes in favor of testing protocols based almost solely on physical and/or anthropometric correlates of talent, or simply current performances (Abbott & Collins, 2002; Regnier *et al.*, 1993). A possible explanation for this deficiency may be the lack of physically observable, phenotypical, or explicit methods of assessing psychological characteristics, as such strengths and weaknesses are often revealed during the course of psychological assessment and evaluation procedures.

Psychometric testing protocols used to identify psychological dimensions of talent are able to account for what can be deemed a 'deficiency of observation', and allow for greater objectivity, standardization of results (Smith et al., 1995), and most importantly identify psychological skills that are most related to outcome variables such as performance, a consequent to talent dimensions in athletes (Mahoney, 1989; Mahoney, Gabriel, & Perkins, 1987). Psychometrics as a discipline is concerned with the technique and theory of psychological measurement of knowledge and skills, attitudes and personality traits. These endeavors are undertaken with the use of testing instruments like questionaires and personality inventories designed to accurately represent measurable psychological constructs (Mitchell, 1997; Kaplan, 2010). Worthy of considerable attention are such variables that have been deemed in past studies through psychometric testing to moderate the development of talent in young athletes. These include self-confidence, or self-efficacy (Andersen, 1976; Vealey, 1985, 2002), self-motivation (Mahoney, 1989), goal-orientation, and anxiety control (Deaner & Silva, 1989), as each has been hypothesized to be a strong psychological correlate of talent in athletes. As was previously outlined, a number of effective testing instruments have been developed to measure such psychological constructs, and are widely utilized in the process of seeking to understand dispositional, cognitive, and attitudinal antecedents to talent. Such testing methods work under the basic principle that these characteristics are trait-based, and thus, relatively stable over an individual's lifetime (Feist & Feist, 2009). To such ends, sport science researchers often aim to identify these traits

during early stages in the development of young athletes prior to full physical maturation. Of these strong psychological correlates of talent, the ability to mitigate and control symptoms of performance anxiety seems to be a central trait in achieving superior performances. These concepts will be discussed further in the following section.

Performance Anxiety, Coping, and TI

There exists a body of evidence to suggest that athletes who possess, and have the general wherewithal to use positive psychological skills, and correspondingly inhibit negative thought patterns, have a higher probability of eliciting superior performances and athletic talent (Greenspan & Feltz, 1989; Mahoney, 1989). Therefore, as a talent identification method, psychometric testing can be implemented with the ultimate goal of identifying such traits and dispositions in athletes and weighing them against objective performance measures or changes in performance to determine their predictive value. One such dispositional trait that testing protocols often identify is anxiety, or more typically in a sporting context, performance anxiety. As it exists as a distinct construct in clinical psychology and medicine, anxiety is typically described as an aversive emotional experience that can develop during potentially threatening, evaluative situations (Eysenck, Derakshan, Santos, & Calvo, 2007), often co-occurring with other aversive mood states such as depression or specific phobias. Generally these aversive states are seen as involuntary and without provocation (Woodman & Hardy, 2001). In a sporting context, Martens, Vealey, and Burton (1990) suggested performance anxiety to be a multidimensional construct comprised of

cognitive anxiety (i.e., worrisome thoughts about one's current or future performance) and somatic anxiety (i.e., individual perception of one's physiological arousal, e.g., nervousness, tension, heart-rate), both having relatively equal bearing on diminished or labored performances in athletes. The operative mechanism proposed here is as follows: an individual with a high degree of cognitive anxiety would manifest a greater cognitive load, with fewer allocated resources dedicated to task performance. Correspondingly, high somatic anxiety generally comes as a result of low self-confidence, a trait shown to be a key correlate of athletic performance. A pertinent example here is a study conducted by Burton (1988), finding a negative linear trend between cognitive anxiety and swimming performance and a positive linear trend between self-confidence and performance. In the two samples investigated by Burton, cognitive anxiety accounted for up to 46% of swimming performance variance and self-confidence accounted for up to 21%. Such data seems to be an effective talent identification method as anxiety measures are correlated to performance variance over time, thus accounting for performance fluctuations, outliers, and physical maturation of athletes.

Further, research has shown that competitive anxiety, and most notably an athlete's ability to manage its symptoms, has been shown to affect athletic performance across a variety of sporting domains including soccer penalty kicks (Jordet, Elferink-Gemser, Lemmink, & Visscher, 2006), table tennis (Williams, Vickers, & Rodrigues, 2002), and rock climbing (Nieuwenhuys, Pijpers, Oudejans, & Bakker, 2008), drawing attention to the widespread importance of

this psychological construct in talent identification protocols. One such study examined competitive-state anxiety relative to performance in youth soccer players, finding that when compared to non-elite level players, elite youth male soccer players are less likely to experience somatic anxiety, and further, are more likely to perceive cognitive and somatic anxiety, and self-confidence as positive states (Reilly, Williams, Nevill, & Franks, 2000). Making use of the Pyramidal Model of Performance Abilities (Matsudo, 1987), it follows that players categorized as 'elite' are predictably more talented than the 'non-elites'.

When applied to track and field athletes, research suggests anxiety and other common mood states to be significant in predicting talent and elite-status in athletes. Morgan (1988) found young elite track and field distance runners generally have a unique psychological profile, producing relatively low scores on anxiety and depression indices in psychometric tests. Similarly, Dale (2000) found elite track and field decathletes to engage in a number of anxiety reducing coping strategies to achieve optimal performance. These included visualization, competing against oneself only, confidence in training consistency, and camaraderie with other athletes. In short, coping strategies and anxiety levels and the shape in which they are manifested seem to play at least an intermediary role in talent identification by way of performance outcomes and athletic status. Certainly, the consideration of such variables could carry a great deal of utility when incorporated into a talent identification and its corresponding funding protocols with track athletes.

Lending support to the present material, evidence derived from athlete self-report and performance appraisals points to the significance of an athlete's state of anxiety relative to performance, and the corresponding identification of talent. Hanton and Jones (1999) found that elite-level swimmers tend to report cognitive anxiety as facilitative rather than debilitative, thus creating a more fertile breeding ground for optimal performance and talent development. Further, in a study of ten American Olympic medalists, Gould, Dieffenbach, and Moffett (2002) found a heightened ability to cope with anxiety in pressure situations to be common to all athletes taking part in the study, indicative of a potential relationship between elite-level status and anxiety management. These cases give credence to the notion that in addition to adaptive cognitions and anxiety management being strong predictors of talent in athletes, they can also be traced post-hoc to firmly established athletes who generally possess and maintain such traits. In sum, the ability in athletes to cope with and mitigate symptoms of anxiety (both at the grassroots and elite levels) has been significantly correlated to performance potential and athletic rank. This type of evidence lends support to the notion that psychological correlates do, in fact, play a crucial role in the mediation and elicitation of superior achievements in sport. An important consideration here is the idea that athletes who lack the necessary physical and physio-motor prowess in their sport (in short, a degree of predisposing talent or superior physical development) might benefit from the ability to cope with and manage symptoms of performance anxiety, yet fail to produce notable performances. Certainly, it cannot be disputed that a prerequisite to success in the majority of

sporting endeavors is the ability to impose physical prowess in competition and practice, with at least a degree of effectiveness and execution. Indeed, different sporting domains would almost certainly call for varying physical strengths in unique combinations, often co-occurring and shaping the rank and success of athletes in their chosen sports.

Morphological/Anthropometric and Performance Correlates of Talent

A great deal of past research undertaken in the field of athletic talent identification has suggested body morphology and anthropometry to be the key (and often sole) predictor of potential across the majority of sporting disciplines (Penney & Lisahunter, 2006). In short, athletes are often separated from their context in sports science research, with a disproportionately high focus on physical characteristics and the 'ideal' aesthetic with respect to a specific sport. In human physiology and in the realm of sports science, the term 'body morphology' refers to the relationship between the structure and function of physical attributes that vary in human populations (Bajramovic, 2011; Talovic, Jeleskovic, & Alic, 2002). As different sporting endeavors require varying skill sets and physical attributes, the 'ideal' physique or body composition of athletes might vary greatly, contingent on their chosen sport as well as the unique combination of physio-motor and technical executions they are capable of. Ostensibly, each athlete possesses, and has developed, a repertoire of skills in his/her sporting discipline which can be limited, enhanced, and largely mediated by unique and unalterable genetics. The term 'anthropometry' is often used in tandem with body morphology, describing the means by which we identify and understand human

physical variation (Eston & Reilly, 2008). Contemporary anthropometric practices can also be centered on characterizing body dimensions related to lifestyle, ethnic composition of populations, and changing nutritional practices, all of which carry a great deal of relevance in athlete talent identification. This section will serve to highlight how identifying and utilizing body morphology, anthropometric data, and performance data has been implemented to identify talent in athletes across a variety of sporting disciplines

In sport science research, the term 'kinanthropometry' is used in place of anthropometry, as it pertains to anthropometric measures related to scientific parameters such as human movement, biokinetics, and applied health sciences (Stewart, 2010). Historically, changing lifestyles and practices (especially during the 20th century) have been regarded as integral in bringing about a heightened human potential toward superior body dimensions and composition, as well as physical feats related to sport (Lozovina, Lozovina, & Pavcic, 2012). Therefore, when considering anthropometric and morphological dimensions of talent in sport, one must consider the evolution of human practices, as changing 'ideal' body types often correspond to the refining of such supplementary practices as diet and nutrition, and medical science. Additionally, ethnic origin and race are of particular consideration in examining athletic talent and body morphology, as outward physical characteristics can vary greatly across different ethnicities (Bret et al., 2013).

As was previously outlined, a certain limitation in the majority of talent identification models is the often over-emphasized physical dimensions of talent

in young athletes, and thus, a failure to consider the context within which they undergo training and preparation, and of course, competition (Penney & Lisahunter, 2006; Evans 2004). In an examination of contemporary talent identification and development programs, MacNamara and Collins (2011) took a critical approach to such models, finding them to be one-dimensional, narrow, and physically-biased, falling short in the consideration of key environmental variables such as parental nurturing, training environment, facilities, and efficacy of coaching as being significant contributors to an athlete's talent. Additionally, their review of extant literature found weaknesses in physical talent ID models themselves, highlighted by the fact that a great deal of high profile athletes who fail to meet physical TID benchmark standards (typically in physical testing protocols) later enjoy great success in their chosen sports. Therefore, an incremental failure in talent assessment creates a compounded effect in TID systems, as not only does there exist an over-emphasis on physical, anthropometrical evaluation pertaining to talent, but in fact, the evaluation procedures themselves are flawed. Correspondingly, in a relatively recent evaluation of talent identification programs, Vaeyens, Gullich, Warr, and Philippaerts (2009) echoed arguments put forth by MacNamara and Collins, suggesting a move away from traditional methods of identifying talent (i.e. solely utilizing discrete performance and anthropometric methods), to a multi-dimensional approach that, intriguingly, involves the 'recycling' of talent through a sporting system, thus allowing individuals previously deemed a poor fit within the system a second chance. Such avenues could effectively neutralize the second

premise of the aforementioned "compounded effect" in flawed and biased TID models as previously dismissed athletes could again be filtered through the system and re-evaluated by alternative means.

Interestingly, this degree of shortsightedness has been found to commonly occur in sporting domains that emphasize strength and power. Gulbin (2001), a talent scout coordinator for the Australian Institute of Sport (AIS), had "found what he was looking for" (p. 24) when an assessment of an Aussie cyclist met physical and anthropometric standards set forth to identify championship potential. The principle issue here is that a large number of potentially talented performers may be excluded from talent development opportunities because of inappropriate or flawed identification measures. Such evaluations are based solely on physiological and anthropometric criteria designed to identify current performance and/or overt physical characteristics rather than potential for development (Abbott & Collins, 2004). It is the contention of MacNamara and Collins (2011) that this limitation is a function of a multi-dimensional scarcity of resources, occurring within the physical, operational, logistical, and financial domains of sport. A proponent of the importance of the physical manifestation of talent, and the ability to identify such variables, might however be in support of models that de-emphasize outside influences and athlete context, readily evident in the vast body of research concerning the overt, physical nature of talent. Despite overall shortcomings in developing a comprehensive approach to talent identification, the significance of physical/morphological/anthropometric

identification criteria is clear, and carries forward utility in identifying athlete potential by observable, objective, and physiologically-based means.

A growing trend in sports science research has been the attempt to identify physical human characteristics that correspond to optimal results on the competition field (Klaus-Peter, 2010). To this end, variation in measurable characteristics such as body composition (Klaus-Peter, 2010; Carling, Le Gall & Malina, 2012), lever (leg and arm) length (Wu et al., 2001), height, weight, lung capacity (Maestu & Jurimae, 2000), heart-stroke volume (Warburton et al., 1999), somatotype (endormorph, ectomorph, or mesomorph; Pieter, 2001) and muscle fiber twitch have been measured and correlated in an attempt to attribute variation in human performance (i.e, demonstrated ability or talent) to distinct quantities and combinations of these variables (MacNamara & Collins, 2011). Though each characteristic typically varies according to the sport in which an athlete competes (e.g, height will almost invariably be a salient factor in basketball; Mathur, Toriola & Igbokwe, 1985), measurements of body composition and muscle fibrotype have generally been seen as traits that are universally advantageous to athletes, and thus, represent a general template to work from in identifying physical talent (Sniderman, 2010; Esbjoernsson et al., 1993; Qu, Li & Yang, 1999; MacNamara & Collins, 2011). In both cases, favorable profiles of each indice (low body fat % and high fast-twitch fibrotype) have been shown to be strong predictors of athletic success and overall talent in young athletes, particularly in sports where the execution of powerful, dynamic movements are crucial for success. To undertake such tasks, Klaus-Peter (2010) suggesed that

clear and reliable methods of body assessments and measurements must be carried out, then displayed in a user-friendly format that allows for anthropological correlations, comparisons, and deductions. This process serves to identify physical dimensions of talent in a coherent manner that allows for easy transfer to comprehensive TID models, and the replication of experimental results.

As mentioned prior, though there are general characteristics that are considered favorable in the competitive arena, there exists a unique requisite skill set, delineating athlete selection criteria according to the physical (morphological and performance-based) and technical demands of an athlete's chosen sport. A pertinent example here is the general selection criteria employed in identifying and nurturing talent in young rugby players, and the accompanying emphasis placed on kinanthropometric characteristics. In an examination of South African rugby players, Van Gent and Spamer (2005) utilized a multivariate approach to talent identification, and found that in addition to a rugby-specific skill set, physical and anthropometric characteristics were generally the means by which athletes were first identified as being viable for team selection. Plotz and Spamer (2006), and Spamer and De la Port (2006) in studies on rugby players noted a continued successful implementation of this approach in the preliminary stages of talent identification. Interestingly, similar findings occurred at the grassroots levels of rugby in South Africa, as youth players aged 10-19 are predominantly assessed using anthropometric, physical and motor abilities (Spamer, 2009). When compared to their counterparts from New Zealand, Hare (1997) and Van

Gent (2003) found that at age 16, New Zealand youth players are more robust (by body mass and length), faster and more agile than South African players. Correspondingly, rugby players from New Zealand performed better on physical and motor ability tests, kicking for distance, passing for distance, and kick-off distance measurements. Such research has served to lay the groundwork for talent identification protocols in the sport of rugby. When controlling for age and sporting experience, kinanthropometric variables seem to play a crucial role in game-specific skill acquisition and prowess, thereby facilitating talent development and identification in young rugby athletes.

Similarly, examinations of TID in American weightlifting have shown an affinity to physical and morphological variables. Despite a wide range of talent identification testing protocols, support personnel, and technology (Brown, 2001), Fry et al. (2006) found criteria by which young lifters are identified and targeted are centered around body mass index, relative fat mass, grip strength, and various other physical performance based talent measures. These variables represent measures of body build, body composition and muscular strength, and were shown to significantly affect athlete selection to elite-group status for major competition. Testing batteries in other nations have similarly focused on physical variables to identify talent in weightlifters, incorporating Body Mass Index (BMI) (Smalcerz, 1994) and muscular strength (Karoushkov, 1983; Smalcerz, 1994) into TID protocols geared toward athlete selection. Of particular interest in the Fry et al. study is that nearly 1/5 of non-elite weightlifters were pre-emptively and erroneously classified as elite based on the pre-competition testing battery,

drawing attention to a multivariate system that lacks basic consideration for both psychological variables and training environment. Unfortunately, failure to account for these non-physical variables serves to squander the scarce resources afforded to weightlifting federations, a distinct barrier to maximal efficiency within the system (Kulesza, 1983).

Certainly, it can be argued that physical/anthropometric talent identification measures vary according to sporting discipline, as different sports require unique combinations of prescribed physical and technical ability (Knechtle et al., 2012). This idea, however, is not limited to strength and power sports. As illustrated with rugby and weightlifting, there exist identifiable physical characteristics that have been deemed favorable in endurance sports that have served to aid in the selection and identification of talented athletes. In endurance athletes, the correlation of anthropometric characteristics, such as body mass (Hagan, Smith, & Gettman, 1981), body height (Siders, Lukaski,& Bolonchuk, 1993; Geladas, Nassis, & Pavlicevic, 2005), Body Mass Index (BMI; Hoffman, 2008), both the length and the circumference of limbs (Lucia, Esteve-Lanao, Oliván, Gómez-Gallego, San Juan, Santiago, et al., 2006; Knechtle, Bauman, et al., 2010), body fat and the skin-fold thicknesses (Hoffman, Lebus, Ganong, Casazza, & Van Loan, 2010), with performance has been investigated in cycling, swimming, inline skating, and running. Such research has yielded well-defined characteristics common to successful athletes across endurance sports, thereby facilitating a practical, economical approach to TID. In varying combinations, each of these anthropometric traits was found to significantly impact race

performance in endurance sport competitors, and correspondingly, have been relatively accurate talent predictors across these sporting domains. In sum, research on physical/anthropometric, and performance related correlates of talent serves as a valiant attempt at defining and utilizing physical dimensions of talent for the purposes of talent identification.

Conclusion

Through the process of analyzing the relevant literature on talent identification in sport, it is readily apparent that there exists a disparity between empirical research on what constitutes talent in sport versus how athlete selection and talent identification are carried out in practice. As was previously outlined in this review, anthropometric and physical performance-based variables are often over-represented in TI models across a variety of sports at the expense more covert, and less observable means of talent ID such as mental fortitude and psychological strength. Additionally, an often overlooked variable worth consideration is the developmental stage by which an athlete is assessed, that may or may not conform to age-relative performance. Recently, researchers have advocated a more dynamic and flexible approach to talent research, advocating for talent identification and development programs that account for biological maturity status and the potential to develop. This means avoiding the exclusion of children at an early age, as youth vary in the rate in which they develop and mature physically (Gray & Plucker, 2010; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). As such, Mohammed et al. (2009) suggested that conventional talent identification protocols favor athletes who mature earlier,

yielding superior age-related performances relative to their peers who are slower to mature. Not only does this trend pertain to physically-based athlete characteristics, but also individual differences and behavioral factors associated with physical maturity in young athletes, as demonstrated in a survey of coaching behaviors by Gray and Plucker (2010). Studies undertaken in youth soccer have provided further insight into athlete maturation, and have shown selection strategies to conform to biological maturity status, which has a moderate effect on fitness-related parameters as well as team selection (Malina et al., 2004; Figueiredo et al., 2011). The failure to consider developmental status represents a fundamental flaw in TI models, and is analogous to the skew toward the physical dimensions of talent outlined earlier, as non-observable and less tangible traits in an athlete are largely ignored in favor of immediate and readily observable characteristics. Therefore, one might characterize conventional talent identification models to be somewhat shortsighted, with a disproportionately heavy focus on the obvious, readily observable, and measurable traits in athletes. To this end, it is then crucial to assess the degree to which the sport policy of national sporting organizations (NSOs) conforms to empirically supported, multivariate forms of talent identification, or if they too make somewhat shortsighted, erroneous judgments of athletes based heavily on the measurable, observable, or subjective and idiosyncratic criteria.

A pertinent example here is the current practice of 'talent-spotting' in the German sport system. In a vast departure from the meticulous, evidence-based approach taken by the former GDR (as previously described in this chapter), the

new Federal Republic of Germany has relied almost solely on the so-called

'expert eye' of coaches and physical education teachers as an appraisal of talent in

young pupils or athletes (Green & Houlihan, 2008). Here there exists an absence

of a measurable standard by which the potential of an athlete can be evaluated

with reliability, since the 'expert eye' of these individuals is nothing more than a

subjective appraisal of sporting potential based on sporting experience or general

opinion. Further, a more objective (and obvious) method widely utilized in the

current German system is the analysis of young athletes' results in competition, a

measure that fails to address maturity status of the athlete, and in teams sports, the

overall strength and cohesion of the team. Despite a systemic approach with a

focus on international success, the present talent identification system in Germany

lacks clarity, reliability, and objective, measurable criteria. Additionally, the

system in place fails to address non-performance related variables such as body

anthropometry and psychological correlates of talent in young athletes.

An important consideration in the discussion of effective talent

identification is that athlete funding structures generally come as a result of funds

that 'trickle down' to NSOs as mandated directly by their federal government's

department of sport and leisure (Sam, 2012). For example, Sport Canada, a

government agency, allocates a finite amount of funds to Athletics Canada, its

governing body for track and field and cross country (Havaris & Danylchuk,

2007; Pankhurst & Collins, 2013) to be distributed to athletes and administration.

As is the case in Canada, nations like Australia and New Zealand have

adopted sport-funding policies that favor 'targeted' sports, or those that are seen

as most viable in terms of podium finishes, world-ranking, and/or media attention and financial benefit (Baka, 2006). For example, following a surprise Olympic gold-medal in the short-track speed-skating event in 2002, the Australian government provided an immediate financial boost to their winter sports program, targeting all sports that succeeded with a podium finish in the Games (those being aerials, alpine skiing, short track speed skating, and mogul skiing). However, a boost in funding granted to a particular sport often entails a funding decrease in another, as is the case in New Zealand's funding system, largely based on results and accountability. Their government mandated SPARC (Sport and Recreation New Zealand) system is geared toward not only rewarding successful performances (i.e. medal counts and qualifying for finals in events) but punishing NSOs not meeting performance expectations by way of public shaming, withholding funds, and direct interventions such as forcing their presence (SPARC that is) at the board level of the organization in question (Sam, 2012).

In theory, NSOs not meeting the performance standards set forth by the federal government could suffer budget cuts as a result, creating an even greater scarcity of funds allocated to athletes and sport programs. Other nations have incorporated similar funding contingencies, namely the British lottery system, where not only are specific sports held accountable for lackluster performances, but individual athletes experience funding revocation or cuts in favor of others who are currently meeting or exceeding performance expectations ("Turner appeals," 2008). In sum, funding structures in these nations can only accommodate a limited number of athletes due to scarcity of dollars, thus creating

a scenario where effective talent identification entails targeting those worthy of attention with a great deal of efficiency. This examination will look closely at a specific NSO, and the methods by which athletes are targeted, and incorporated into funding structures

The goal of this study is to examine the state of track and field in Canada in terms of its effectiveness in identifying talent and allocating resources to talented athletes. Does Athletics Canada (AC) follow a holistic and scientific approach in identifying, developing, and funding their athletes based on the body of literature available? If not, such a deficiency could carry grave consequences to the system. When it comes to talent identification protocols, this could potentially lead to misappropriations of funds in the form of targeting the wrong athletes less deserving of financial support, that is, those who exhibit physically-based, observable talent-based characteristics. As previously outlined, sport science literature suggests a fundamental shortcoming in talent identification practices has been the consideration of psychological dimensions of talent in assessing performance potential, and additionally, the degree to which an athlete's developmental stage is deemed worthy of attention. The former tenet has been demonstrated by the literature to be a significant contributor to athletic talent, both by empirically-based means (the body of literature) and athletes' retrospective recall (self-report measures). The latter tenet should not be limited to youth and adolescent athletes, but simply any individual who demonstrates superior ability regardless of age. This study will explore the extent to which AC incorporates these often underrepresented talent correlates into athlete funding

policy, or if athlete funding is based solely on tangible and observable traits, performance marks, or simply historical precedent. Additionally (as I mentioned in chapter 1), a related issue I will address is if AC, in fact, follows their own funding protocols, directly applying carding mandates to athletes in a fair and just fashion. An all-encompassing practical framework of what talent constitutes could carry great utility in this domain, as NSOs like Athletics Canada have a finite amount of funds dedicated to athletes, and therefore would be best served to distribute them with the greatest validity, efficiency and accuracy. To carry out this study, I utilized an appropriate research methodology that is well equipped to identify and interpret funding specifications, and stipulated talent identification and performance mandates. The following chapter will serve that purpose, and provide a rationale for the sequence of methodological procedures that guided my inquiry.

Chapter 3: Methods

Introduction

Through my examination of a breadth of academic research on talent

identification, it became clear that TI is a multidimensional process where a

number of key correlates have been shown to be effective predictors/determinants

of current or future success in sport. Variables such as anthropometric measures,

psychological constructs, and athlete age and maturity carry with them a complex

array of traits that through the scientific method, have been shown to be effective

in identifying athletes who possess the innate potential to blossom beyond their

sporting peers. Correspondingly, athletes labeled as talent rich often reap the

benefits of their athletic prowess through financial rewards. In Canada, this type

of compensation awarded to athletes is known as *carding* (Athletics Canada AAP

Policy Olympic Stream, 2013) and provides performance incentives to athletes,

allowing them to train uninterrupted as full-time competitors in their chosen

sports. As I discussed in chapter 2, NSOs have finite resources that they allocate

to athletes, and thus, would be well served to act with the greatest of care in

granting financial support to deserved athletes. To facilitate such practices,

governing bodies like Athletics Canada implement criteria that dictate how and

why athletes should be funded through carding mandates produced on an annual

basis. To this end, the discussion in this chapter will describe and provide a

rationale for the particular research methodology I implemented to collect carding

criteria data on the funding of track and field athletes in Canada. Additionally, I

will highlight the process by which I analyzed and coded data contained in

carding policy documents to give meaning to the process of how talent identification is carried out through current carding practices.

The undertaking of such a task called for a research methodology that facilitated the thorough analysis and interpretation of written text, producing a detailed and replicable data set from the carding documents to be examined. In short, my aim was to create a rigorous study, meaning I set out to demonstrate how and why the course and results of this study are significant, or worthy of consideration (Mayan, 2009). Rallis (2014) posited that conducting a rigorous study entails examining more than one dimension, indicator, or construct rather than keying on a single element or point in time as the sole tool of interpretation. Therefore, to add multiple dimensions to this study, I examined AC carding documents from previous years to account for potential anomalies in the most recent document. To carry out this task, I though it most appropriate to utilize a qualitative data collection strategy in order to fully capture the essence, prevailing themes, and primary purpose of carding documents. Alternatively, a quantitative orientation toward data collection and analysis might have failed to capture and conceptualize major themes in the documents, thus creating a less comprehensive data set, or at minimum, one lacking in substance and descriptive quality.

What is Qualitative Research?

Qualitative inquiry can be understood as a primarily naturalistic, inductive and interpretive means by which researchers attempt to ascribe meaning people attach to their experiences or underlying a particular phenomenon (Mayan, 2009). To such ends, the central aim of qualitative researchers is to derive meaning by

showing that examining a particular group of people, or various documents, images, or sounds is significant and can give meaning and improve our understanding of the world. Here, data come in the form of documents, quotes, interviews, field notes and video/electronic communication, rather than raw numbers as data points (Merriam, 2002). In short, qualitative research is *richly descriptive*, meaning its product uses words and pictures, rather than numbers and statistical analyses, to convey what researchers have learned.

In this way, the researcher assumes the role of as the primary instrument of data collection and analysis, and must act with discretion and ensure a degree of self-monitoring. Invariably, personal context and biases are inherent throughout a research study, and thus, researchers must be aware of their unique perspectives and the ways in which they shape data collection and analysis (Peshkin, 1988). The personal context of qualitative researchers is a key characteristic of the research discipline, and serves to add a degree of *humanness* to data collection, analysis, and interpretation. Individual researchers vary in terms of their academic background, life histories, ethnicity, and the uniqueness of their cognitions, all of which can lead them in novel directions that give 'truth' to the questions being explored (Mayan, 2009). In this way, qualitative research is largely an inductive process, avoiding the use of existing theories and preconceived notions to gather and analyze data. Rather, qualitative inquiry builds questions, concepts, and theories from the ground up, and postulates new and intriguing truths from analyzed data. This is not to say a degree of deductive reasoning cannot be applied to qualitative inquiry. Berg (2001) and Patton (2002)

agreed that deductive reasoning through the application of existing data or theories can carry great utility in qualitative research, and can serve to provide depth and reliability to a study's findings. In this case, the researcher must proceed with caution in applying pre-existing theories to a qualitative study. It is crucial that data and derived theories from previous studies are analogous and pertinent to the research being undertaken, as their misapplication might result in erroneous findings grounded in prior judgments (Zhang & Wildemuth, 2009).

Correspondingly, Marshall and Rossman (1995) proposed that qualitative inquiry, by design, enables the researcher to perform, inductively, the following integral functions: a) to understand processes; b) to provide a rich description of poorly understood phenomena; c) to understand differences between stipulated and implemented theories or policies; and d) to discover thus far undefined or unspecified contextual variables. The understanding and utilization of these key tenets is crucial to an effective and rigorous qualitative study.

Assuredly, carding policy documents are comprised of what one could only characterize as explicitly stated policy initiatives, forming the basis for the funding of track and field athletes in Canada. What is not as clearly understood is why these criteria exist and what theories or facts they are derived from. Therefore, function 'd' referred to above becomes key, as this study was designed to look at these contextual variables in carding criteria, and determine whether they are in line with science-based principles of talent or potential. Additionally, effectively executing function 'a' from the list above generally aided in this

process, as well as provided insight into the degree to which AC abides by their own carding mandates.

As a research approach, qualitative inquiry is a process that has the potential to utilize any number of theoretical orientations, research modalities and corresponding data collection strategies to gather information and make sense of the variables it assesses. For example, Patton (1990) posed 10 discrete qualitative methodologies, each to be applied according to the types of questions researchers are asking and their data gathering techniques/resources. Relevant modalities included in his list are phenomenology, basic qualitative study, and ethnographic studies. Correspondingly, Creswell (1998) identified five research 'traditions', including grounded theory, case study, phenomenology, ethnography, and biography, all of which are considered popular choices in the qualitative sciences. Interestingly, as many as 45 qualitative research strategies have been suggested by Tesch (1990), wherein he delineated each into mutually exclusive categories, and posited that each carry utility in specific research contexts.

To this end, it was most suitable for the purpose of this research project to conduct a qualitative study using textual analysis (or content analysis) to collect and interpret data. As all documents pertaining to carding criteria, its conditions, and limitations exist in written text, a pertinent course was the use of basic qualitative textual analysis to determine the talent identification protocols by which athletes are evaluated, and correspondingly funded. Primarily, the documents to be analyzed are in the public domain, and therefore, are accessible to any individual. To this end, an important consideration is the breadth of AC

policy material that can be considered relevant to this discussion, thereby contributing to the research question. Thus, it was through careful deliberation that I selected policy documents to aid in establishing a comprehensive, rigorous study. To this end, Krippendorf (1980) and Berg (2001) each proposed content (or textual) analysis to be an effective and widely utilized tool in the analysis of the written word, ranging from interview data to the analysis of documents or text. Consequently, I can certainly stake the claim that my data collection strategies were empirically supported.

Content Analysis as a Qualitative Research Method

Presently, content analysis is an extensively employed method of inquiry in academic research, and has been seen as effective across a breadth of fascinating disciplines. Apart from raw textual analysis, content analysis has been applied to library science (Allen & Reser, 1990), coding artwork or drawings (Wheelock, Haney, & Bebell, 2000), and human and animal behaviors observed in video-recorded studies (Stigler, Gonzales, Kawanaka, Knoll, & Serrano, 1999). By definition, content analysis is a replicable and systematic technique for compressing many words of text into fewer content categories based on explicit rules of coding (Berelson, 1952; GAO, 1996; Krippendorff, 1980;Weber, 1990). Mayring (2000) described content analysis as an approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytic rules and step by step models, without rash quantification. A further and more general definition posed by Holsti (1969) stated content analysis to be an analytical tool for making inferences by

methodically and objectively identifying specified characteristics of messages. The latter definition is, in particular, applicable to this study as I analyzed and explored AC carding protocols, thereby making inferences with regard to how and why athletes receive funding.

As is the case with qualitative inquiry in general, a researcher engaging in content analysis is well served to limit the use of existing theory or research literature (preconceived theories or constructs) during data collection and analysis (Kondracki & Wellman, 2002). Rather, it is important to allow categories, names for categories, or codes to flow freely from the data, perhaps laying the groundwork for new constructs or theories to be identified organically. Mayring (2000) referred to this phenomena as *inductive category development*, a strategy that leaves room for references to pre-existing theory in the discussion section of a study. Often times when a researcher deems a preceding theory to be incomplete or worthy of further exploration, a *directed approach* (which I shall elaborate on later) is applied so as to utilize deductive reasoning strategies (Potter & Levine-Donnerstein, 1999).

According to Downe-Wamboldt (1992), the goal of content analysis is to provide understanding and knowledge of a phenomenon that is not fully understood. In attempts to conceptualize or achieve an in-depth understanding of a phenomenon, the researcher engages in subjective interpretation of one or more written documents through a systematic process of coding and deciphering unifying themes in textual data. In general, the derivations of these unifying

themes serves to identify and add richness or breadth to phenomena (in this case carding documents) through the identification of trends in observable data.

The course of content analysis typically begins during the early stages of data collection in a study, independent of a researcher's decision to implement its techniques before any work has been done (Miles & Huberman, 1994). This represents a significant strength of content analysis, as its early involvement in the compilation of data allows the researcher to make easy transitions between concept development and data collection. In this way, any unexpected occurrences or phenomena that come as a result of the data collection-concept development process can be incorporated into further analysis of the pertinent document(s). In short, content analysis enables researchers to sift through numerous and information rich documents with a focus on describing the goals or intentions of individual groups (Stemler, 2001), or institutions like Athletics Canada. This technique enabled me to examine available documents in their true state, establish patterns or trends toward how funds are allocated, and investigate whether athletes are being funded in a fair and just manner. The latter is an outcome variable that is a significant determinant of how fairly funding dollars are spent, and if AC fund athletes as they claim to in carding documents.

Forms of Content Analysis

For the purposes of this study, I will give a brief overview of three distinct procedures where content (or textual) analysis might be employed, each of which could be considered mutually exclusive, and empirically supported. A comprehensive description of each method will serve to give credence to, and

legitimize, the qualitative research strategy I have chosen to collect, analyze, and interpret my data. These procedures are *directed*, *summative*, and *conventional* content analysis.

Directed content analysis is a research tradition that involves the use of an existing theoretical framework to inform research design, data analysis, and interpretation of results in qualitative research (Hsieh & Shannon, 2005). Generally, researchers who implement directed content analysis as part of their research methodology act with the prevailing belief that a predisposing theoretical construct or theory has been left incomplete, and warrants further inquiry. In this way, directed content analysis is largely deductive in nature, and an exploratory process that implements 'top-down' reasoning stemming from prior research. Of course, this process also calls for an inductive component, as the existing framework has been deemed to be incomplete, and worthy of further analysis to validate, or extend conceptually, its scope (Hsieh & Shannon, 2005).

Conducting qualitative research using a directed approach to content analysis generally involves the use of components from prior studies such as their general methodologies, research design, or perhaps even coding units that have been predetermined based on prior research (Potter & Levine-Donnerstein, 1999). Correspondingly, any relevant text that cannot be assimilated into the existing coding scheme is assigned a new code, thus creating room for elaboration on the existing theoretical framework from which the study has its genesis. Of importance here is the commitment to a reliable and rigorous study, meaning pre-existing coding definitions and categories must be identical when using a directed

approach. A failure to replicate these techniques could result in experimental confounds due to an erroneous interpretation of codes and definitions taken from the pre-existing theory. In this case, that very theory would be rendered moot, invalidating the current study.

Therefore, the directed approach to content analysis can be applied to a wide array of studies attempting a replication or incorporation of past academic work, or perhaps derived theories to draw from. Through extensive research, I became aware of the absence of a study similar to mine that I might draw theoretical constructs from, or conceivably, apply coding definitions and procedures. Additionally, a directed approach has the potential to build on existing theories, thereby contributing to the body of knowledge or theoretical constructs in a given discipline. A strictly inductive approach using codes and coding definitions derived solely from raw data carries utility in that there exists the potential for the genesis new and innovative theories (Hsieh & Shannon, 2005). Certainly, directed content analysis can be considered an effective means by which researchers consider, gather, and analyze data.

In brief, the summative approach is best described as a hybrid variety of content analysis that measures the usage and frequency of words, as well as their inherent meaning. These practices are called *manifest content* and *latent content* analytical techniques, that when used in tandem, have been reported to be advantageous when applied to studies that analyze manuscript types in a particular journal or specific content in textbooks (Hsieh & Shannon, 2005). According to Rapport (2010), summative analytical techniques should be

collaborative in nature, where manuscripts or written text are examined through group analysis sessions aimed at exploring the details of textual data. Generally, this approach is considered most applicable in instances where text is less ordered, structured, and to studies where the chosen methodology is somewhat unclear (Rapport, 2010). The summative approach relies heavily on the credibility and prowess of those undertaking the study, as interview transcripts are often ridden with idiosyncratic language and colloquialisms, items that the researcher must categorize, define, and code with precision (Weber, 1990).

As a research tool that relies heavily on the effectiveness of textual interpretation, the summative approach can be effective under a variety of research conditions. For example, a study engaging in participant interviews as part of the data collection process calls for the interpretation and analysis of latent content, an appropriate application of summative content analysis. Invariably, interview transcripts have an abundance of slang and idiosyncratic language that are subject to interpretation, where a summative approach carries great utility. Thus, this approach to content analysis is an effective tool in the presence of textual data that lacks coherence, linearity, or is grammatically unsound.

From a methodological standpoint, the nature of the analyzed documents required an approach well-suited to examine funding policy documents that were to be interpreted at face value, without the consideration of latent meaning and/or individual subjectivity. Additionally, due to the absence of past academic work in this area, the mechanism of reasoning was largely inductive. This study will gather and analyze textual data using a *conventional approach* (Hsieh & Shannon,

2005) to content analysis, which dictates the researcher avoid using preconceived categories (Kondracki & Wellman, 2002) in favour of inductive category development. As I stated earlier, this process is carried out by allowing categories and names of categories to flow organically from the data, amidst potential biases and preconceptions of the researcher. In this way, existing theoretical frameworks, definitions, and coding names and categories (if they indeed exist) are completely ignored in favor of a naturalistic process that allows important to be identified in the document.

As an open-ended process, the conventional approach was most aligned with the goals of this study, that is, the examination of how athletes are funded and the concordance with talent identification literature. AAP policy documents explicitly state the criteria by which athletes are granted (and maintain) carding, eliminating any ambiguity or inferences that might precipitate from the written text. This approach ensured the common themes and codes in the documents to be freely identified, as its primary advantage involved gaining direct information from textual data in a streamlined, efficient manner. Of course, I could not ignore the notion that my own subjectivity and biases were ever-present, holding the potential to affect this study's credibility as I may have failed to identify and generate key coding categories and/or generate erroneous ones (Lincoln & Guba, 1985). My intention was to minimize this potential confound in the following ways: First, to engage in an inter-rater appraisal of my coding scheme with my supervisor or an academic colleague, ensuring greater reliability in coding categories and definitions. As an outside observer, I felt either party would

provide this study with an impartial second eye through which data could be examined. Second, I engaged in rigorous self-monitoring throughout the data collection and analysis process, with an acute awareness of my unique context and preconceptions about talent identification in general, as well as the way athletes are funded.

Procedure

Consistent with my engagement in data collection and analytical inquiries, I also followed a series of steps proposed by Zhang and Wildemuth (2009). In order to support valid and reliable inferences, qualitative content analysis involves a set of clear and systematic procedures for processing data (Tesch, 1990). Though my intention was to be flexible in my undertakings, following this set of guidelines served as a general template for my inquiries, whilst supporting the free flow of ideas, and the potential to move both forward and backward between steps. This, in turn, produced a more valid study, as the potential to incorporate new or unexpected findings during data analysis was strengthened. Through this flexible approach, my aim was to ensure that what I discovered was a true representation of the data I collected and analyzed. For example, if during the coding or data analysis process I were to come across a document I deemed particularly relevant to AC carding protocols or talent identification, I would have the freedom to backtrack to a prior step (perhaps data preparation) to include this new information. In sum, this section will focus on the means and process that guided my inquiry, and the series of steps I took in order to produce a complete and reliable study. These include sampling technique, the course of locating,

collecting and interpreting textual data, and the communication of my findings.

Sampling

As stated prior, I set out to analyze current and past carding documents, as well as alternative documentation (pertaining to AC's adherence to their own mandates) that fulfilled this demand, strengthening the rigor and significance of this study. Additionally, using textual content analysis, I analyzed and coded the 2013-14 carding criteria document published by Athletics Canada, and to account for changes or anomalies present in the most recent document, examined carding protocols published by AC for each of the two previous carding years. With the purpose of establishing trends toward how funds are allocated, and AC's adherence to their own carding guidelines, I found it sensible to analyze previous years of AAP policy documents. This served two purposes. First, a sample group of carding policy years served as a more complete representation of funding mandates to Canadian athletes. The potential for variance in current and past carding policy documents required analyses across a number of years to provide a more reliable and comprehensive representation of funding protocols. A second aim of this research is to explore the nature of AC's funding practices in relation to the conformance to their own carding criteria.

To create a sample of athletes for the purpose of determining 'rightness' in funding practice, I created a carding pool of athletes that received funding for each of the AAP Policy years I am examining. Following the identification of these athletes, I created a spreadsheet document listing each of them on one axis, and codes I identified in the documents on another. These codes represent the

common themes present in the documents, providing a rich and detailed description of the ways in which athletes are carded. I initiated this task following the coding and analysis of AAP policy, as it was crucial to first build common themes before looking at whether AC follows their own policy. Accordingly, to create my sample I elected to include every carded athlete carded during the 2011-12 and 2012-13 seasons, so as to generate a complete picture of the funding climate in Canada. Therefore, I chose to compare all applicable codes I created from the documents with the most recent published list of every carded athlete. In general, this type of method is designed to evaluate whether or not AC funding dollars are being allocated according to carding stipulations within the documents. Here, I believe there to be ethical implications, as those who deserve carding dollars, in theory, should be receiving them. I will briefly summarize the ethics of carding practices later in this chapter. The carding pool of athletes I mentioned, as well as the applied codes, make up chapter five in my study.

Analytical Procedures and Document Selection

To follow, I referred to the aforementioned Zhang and Wildemuth (2009), who proposed a sequential process to be used as a guideline in a qualitative content analysis. First, *preparing the data* entails the researcher choose one or more documents or forms of written text that he or she feels will best bring to light the theoretical construct being evaluated. Additionally, the choice of what parts of the text are to be analyzed should be determined during this stage, as the analysis and/or coding of redundant or inconsequential text would only serve to complicate a study. I could not expect to execute this process without the analysis

of a small portion of useless data, however, one of my primary concerns in all stages of this study was rigor. Thus, my preference was to have extraneous data rather than mistakenly excluding key data points that might be relevant. Essentially, I chose to employ the 'better safe than sorry' approach.

To engage in this type of thorough approach to data collection and analysis, I elected to analyze and compare the most recent, as well as the previous two AAP funding policy documents. A protocol such at this, that is, the inclusive analysis of a series of AC funding seasons served to create a more reliable study. Further, the potentiality for policy-related changes to funding procedures exists from year to year, and thus, a sample of several seasons was crucial as it mitigated the effects of one year anomalies in funding and TI practices. For example, in sample year 3 of 3, AC policy might dictate an emphasis on athletes' year-long training program, a funding contingency that had never been considered. Such an anomaly might have confounded the data analysis process, as this type of criterion had not previously existed in policy documents, and might be abandoned in subsequent years. Additionally, analyzing a single funding year is problematic, as one of the aims of this study was to look at whether AC is funding the right athletes. Incorporating past funding policy years into this process was therefore a necessity, as this study aimed to assess whether athletes who received carding were deserving of it, and as such, if AC adheres to their own carding protocols. Therefore, including past years into the data pool allowed me to look at the criteria by which athletes were assessed over multiple carding cycles.

Further, I was able to *define the unit of analysis* (Zhang & Wildemuth, 2009), which refers to the basic unit of text to be classified during content analysis. Weber (1990) claims this stage to be integral to an effective qualitative content analysis as differences in the coding unit definition can affect coding decisions as well as comparability of outcomes with similar studies. Typically, coding units exist in the form of individual themes rather than discrete linguistic units, and can come in the form of words, phrases, sentences, or even an entire document. Importantly, when using a theme as a coding unit, one must find the expression of an idea within a text grouping of any size that represents a relevant issue or theme. (Minichiello, Aroni, Timewell, & Alexander, 1990). According to Tesch (1990), a researcher should read and become acutely familiar with all data as a whole before proceeding. This allows for greater ease in creating and giving names to individual themes before the actual coding process begins.

After coding all relevant text (a process that will be discussed further in the section on data analysis) I assessed the consistency of my coding technique. Without question humans are prone to error, and in qualitative data analysis, this can be a common occurrence. Often researchers operate under the assumption that because a coding scheme was proficiently executed, the whole corpus of text is also consistent (Zhang & Wildemuth, 2009). Additionally, I adopted the position that during the duration of this study, my coding scheme could change slightly to accommodate new potential categories or coding rules. As I previously stated, my own conception of coding rules could have become skewed during the course of data analysis, something I also assessed when the coding of data had ceased.

Accounting for these possibilities in a systematic fashion assisted in my assurance of rigorous and auditable findings (Thorne, 1997). That is, in stating explicitly my intentions, not only did I allow room for this study to explore avenues I had yet to consider, but I outlined a logical process by which a critical reader is able to relate actual data to final conclusions after reading this research.

Generating Conclusions and Reporting

The two subsequent stages involved in this process were *drawing conclusions from the coded data* and *reporting methods and findings* (Zhang & Wildemuth, 2009) of this study. Though a great deal of methodological logistics and the means by which I carried out my study have been reported in this chapter, I anticipated encountering unpredictable circumstances during data collection and analysis that might warrant a deviation from my initial course. As I stated prior, accounting for such variances allows the readership of this study to understand, with clarity and coherence, how I came to certain conclusions through the study's course. At this stage in the process, my intention was to make inferences about, and explore the dimensions or scope of data categories, whilst detailing potential patterns and themes derived from the full range of data (Bradley, 1993). Following this I was able to display results in written form, and summarize the full breadth of my findings with rich descriptive quality. My intention here was for the reader to gain a complete grasp of the unifying coding themes that I generated from the data. The following section will detail the means by which I established common themes in the text.

Data Analysis

The initial stages of data analysis involved *developing categories and a coding scheme, testing the coding scheme on a sample of text* (Zhang & Wildemuth, 2009), and thereafter, identifying unifying and common themes present in the data. With regard to category development, I generated distinct categories inductively, rather than apply previously derived theories or coding categories. As I insisted on previously, I became well-versed with the AAP Policy documents as a whole, reading through the material until I achieved a high degree of familiarity with it. In staying true to the conventional approach to content analysis, it was my intention to be mindful of any preconceived notions I may have held (as a track athlete myself) toward the sample of textual data. Such an approach allowed me to examine current and past AAP policy documents and ask questions like: how and why do the documents vary? How are they similar? Why do they exist in their current form? Importantly, I assessed the current form and the potential state of flux of carded Canadian athletes, and if in fact, they have been justly selected for funding based on codes I derived from the documents.

The process of analysis involved the coding of textual units (words, sentence fragments, sentences, or paragraphs) into categories that are internally homogeneous, and mutually heterogeneous (McKee, 2003). This ensured coding categories were distinct from one another, and contained elements that were representative of their themes. In the absence of previous qualitative studies on NSO funding policy and talent identification, I was unable to utilize coding schemes or strategies used in prior scientific work. Therefore, it became

imperative that I generate my own unique coding scheme that proved efficacious throughout data collection and analysis.

Further, I was critical of coding categories and sub-categories, and combined or broke up such units if it allowed for greater coherency in the displaying of data (Morse & Field, 1995). I accomplished this through the use of a tree diagram, with the relationships between units and subunits stated explicitly to give a rationale for any delineations or combinations of codes. Following the creation of my coding scheme, I coded a sample of text from AAP documents, and with an academic colleague, discussed coding procedures and how they are taking shape. This provided a degree of consistency, thus validating (and providing inter-rater reliability for) the coding scheme. Any disputes or doubts about the coding scheme were resolved through this process. (Schilling, 2006).

Following this, I executed the generated coding scheme, and coded all text that was deemed relevant to the study through a persistent immersion in the documents. Notably, this process could not begin without firm inter-rater agreement on the consistency of the coding scheme I had chosen. Schilling (2006) proposed that throughout the coding process, the researcher should check coding rules repeatedly in order to avoid straying from previously agreed upon rules and definitions. Engaging in this practice granted me the assurance of the utmost consistency throughout the coding process, and the potential for new concepts and themes being included in the coding manual.

Judgment Criteria and Ethical Concerns

Of crucial concern for me was the creation of a replicable study, a task that called for the reporting of, with maximal accuracy, the processes and analytical procedures I was operating under. Through consistent monitoring and recording of coding procedures, and methods used to establish trustworthiness (for example, establishing inter-rater strength through peer evaluation of my coding scheme), I produced greater *dependability* in this study. Dependability necessitates a high degree of coherence in the internal process of this research, simply by checking and re-checking consistency during the course of a study (Bradley, 1993). By accurately reporting analytical procedures, I ensured a replicable study, and I would posit, created research with the utmost validity. For the purposes of this research, a valid study meant the interpretation and accurate reporting of findings in a coherent, understandable fashion (Rallis, 2014). Since this study is the first of its kind, I felt it was responsible to proceed with the utmost rigor, setting a precedent for further inquiry into this subject and potentially forming the basis for academic research in this field.

Ethics

In qualitative research, the absence of interviews should not necessitate a lack of adherence to crucial ethical principles of scientific research. To this end, my study certainly conformed to ethical guidelines associated with document analysis, namely ensuring research integrity, and the satisfaction of organizational and professional demands (Denzin & Giardina, 2007) associated with the analysis of Athletics Canada documents. To ensure these guidelines were met, I carried out

data collection and analysis with *probity,* or a concerted effort toward determining truth in the analyzed, and using multiple avenues to do so (Aluwihare-Samaranayake, 2012). Correspondingly, an inherent advantage with a study of this kind was it did not require qualitative interviews to supplement data derived from the AC documents I made subject to analysis. Therefore, any ethical considerations with regard to participant consent, or the well-being of research subjects, were rendered moot. Consequently, the primary means by which I guaranteed the ethical integrity of this study was to act with the utmost probity, thereby setting the stage for further rigorous and valid research.

An important ethical consideration I feel is worthy of attention here was addressed by the second part of my study, examining the degree to which carded athletes fulfill the necessary criteria set forth in the documents. As I have stated numerous times in this study, Athletics Canada has a limited number of cards to grant athletes, and thus, has an ethical obligation to allocate funds to the most deserved individuals. In essence, I feel it would be ethically dubious to card athletes who's merits fall short of baseline criteria outlined in AAP Policy, whilst potentially neglecting individuals who have achieved these standards. In addition to these 'human' ethical concerns, it should be noted that AC's budget provided to them by Sport Canada, a government organization funded by tax dollars. Certainly, it would be a responsibility to tax payers to see to it that their dollars are spent according to well-thought-out, fixed policy.

Summary

Denzin (1989) posited that effective qualitative research must present findings in such a manner that attention is paid to both description and interpretation of data. Qualitative content analysis is an interpretive discipline, and therefore, I have reported findings in a way that made room for the subjective appraisal of my personal and theoretical position as a researcher. In essence, my goal was to provide a rich description of the rationale behind carding selection and athlete identification in Athletics Canada, and additionally, whether carded athletes measure up to what the documents mandate. Therefore, I shall present my findings explicitly in my claims regarding the relationship between actual data and my conclusions about the data (Thorne, 1997), while highlighting the significance of what I have uncovered. With regard to athlete funding worthiness, I selected all carded athletes present across all three documents, and charted their carding worthiness based on the codes I derived. My intention was to provide an interesting and readable report, without the use of matrices or statistics. Though I did utilize charts and coding trees for my own purposes, the data I have presented will serve to richly describe these phenomena strictly through written text.

In sum, choosing to implement qualitative content analysis as a research methodology required an adherence to the depth and rich description that accompanies such a task. In correspondence with such efforts, my ultimate aim was to generate meaningful coding categories that reflect AAP policy, and more specifically, the appraisal of athletes' worthiness of receiving financial assistance in the form of a carding stipend. As was stated prior, I generated my own unique

coding scheme (including coding categories) as I was unable to find a completed study similar to mine. Through collaboration with my aforementioned academic colleague, I aimed to create an effective coding scheme that most accurately represented the data, bringing forth the key constructs I sought to address (i.e., how talent is construed and rewarded by AC). In regard to the carding worthiness of athletes, it was deemed sufficient to chart and compare carded athletes to the criteria by which a Canadian athlete receives funding. In doing so, each athlete was assessed as a separate entity, and with a focus on the ways in which they measure up (or fail to measure up) to the minimum standards for carding. This type of evaluative procedure accounted for anomalies in results, as perhaps one policy document might significantly vary from another, thus not capturing the full scope of carding practices in Canada over time. Should the long-term financial commitment to these athletes not be critically examined, perhaps in favor of funding younger or simply more deserving performers? Correspondingly, are the athletes receiving carding being selected on the basis of their merits, and the mandates put forth in the documents? As I stated previously, AC has a finite number of cards to grant athletes, and I would argue, have a responsibility to allocate funding dollars in a just, explicable way. With these considerations in mind, and implementing a methodologically sound analysis of textual data, I am confident that my study assessed and measured what it intended to, and moreover, was rigorous enough to be replicated in further examinations.

Chapter 4: Data Analysis and Results

Introduction

Through the process of analyzing Athletics Canada's AAP Policy documents for the years 2011-12 through 2013-14 inclusive, I identified a number of common themes with respect to the nature of athlete carding protocols. It was through persistent immersion in these policy documents that I was able to identify and define such themes, and determine the ways in which they are interrelated. Moreover, it is my observation that codes and coding categories reflecting carding policy present in the text are intertwined in a network of causality and reciprocal influence. To clarify, I am referring to the means by which codes I have derived from the text overlap, and seem to impact one another in the form of policy guidelines and initiatives. As a guiding principle for my inquiries, I made strong efforts toward maintaining an inductive approach to data collection and analysis for the purpose of generating codes and coding categories organically. That said, I am mindful of the personal context I bring to this study as a track and field athlete, and humbly acknowledge that it will shape, at least to a minor degree, my approach to gathering and interpreting data. On the contrary, I am also aware that the intrinsic knowledge I possess could strengthen my findings, or perhaps grant a degree of legitimacy to this process. I recognize and am willing to acknowledge that the lens through which I look at the world might result in unique perceptions, cognitions, and/or interpretations that have ultimate bearing on my findings in this study as a track and field athlete in his late 20's.

This chapter has a number of functions. Primarily, it will be describe and define the common themes I derived from AAP Policy documents. Each coding category will be reviewed according to its frequency in the documents, relationship to other codes (by definition, proximity in the document, or alternative measures), and association with talent identification and carding. Such a process is integral as it directly addresses the research question of how track and field athletes are funded in Canada. It is through this practice of identifying, giving substance to, and evaluating these coding categories that the majority of discovery during data collection and analysis took place. Additionally, I will describe in fine detail the process by which I engaged in data collection and the coding of text. It was through rigorous self-monitoring and attention to detail that I tracked my internal processes, and the order by which I carried out this research. As I stated in the previous chapter, it is my hope that this study will ascribe meaning to the carding protocols illustrated in the AAP policy, and to do so with the greatest legitimacy, I shall fully disclose my own internal processes and their relationship to the progression of this study.

Lastly, I feel it is pertinent to provide a thorough description of the differences that exist between each of the three AAP policy documents from 2011-12 to 2013-14 inclusive. Short-term changes in policy mandates between carding cycles might reflect a value shift in what is deemed 'funding worthiness', or essentially, a just allocation of funds. Perhaps, variation in the documents is a product of the cyclical nature of funding protocols, representative of the nearing of an 'Olympic year' or in post-games seasons. I felt these were worthwhile

considerations. One document might stipulate a carding criterion that is absent in one or both documents, and therefore, reporting that criterion as (or as part of) a general theme present in the text would be a misrepresentation of the data. Consequently, I feel a section on these differences is crucial, and will generate a greater understanding of the documents, and how athletes are carded.

It was through persistent immersion in the AAP policy documents that I was able to engage in a comprehensive approach to data collection in the form of identifying and defining common themes in the text. In gaining increasing familiarity with the documents, I adopted the position that in order to secure the greatest understanding of the documents, a sensible course of action would be to first identify and code the differences each document had with respect to the others. In doing so, I was able to identify policy-related changes in AC carding protocols from season to season, and formulate hypotheses as to why these changes took place. After reading each document three times, the basic differences between each became apparent, so much so that they became a focal point for me in initiating the data collection process. At this point, I felt that the most pertinent course of action was to create three sets of comparisons using two documents each time. This meant highlighting the differences between documents one and two, two and three, and one and three. As an organizational tool, and to give meaning and depth to these changes, I assigned basic codes to common themes present in the differences themselves. I will also provide explanations as to why these changes may have taken place. This will be discussed in the final section of chapter four.

After identifying the differences between each of the three documents, I was able to start the initial stages of coding. Once again, I went through each document in repetition to become well acquainted with the policy initiatives present in them, and to gain a general flavor of their subject matter and wording. Through this process I began to see repeated words and phrases aimed at describing carding policy, as well as other relevant, yet subtle articulations that seemed to be included for the sake of clarification, or perhaps purposeful ambiguity. To clarify, though AC policy is spelled out in fairly concrete terms, the authorship of the document included criteria that are worded in such a way that leave them open to interpretation to a degree. In this way, AC can assume greater control over decisions toward the granting of funding as the organization could conveniently interpret the wording of carding criteria, granting funding to athletes on that basis. Nevertheless, the majority of policy phrasing is written explicitly, and spelled out in plain English in a succinct, understandable fashion. The next section will provide rich description to the common themes present in the documents, how each category and code were identified and formed, and the steps taken to bring forth these salient themes.

Generated Codes, Categories, and Common Themes

Just as I proposed in chapter three, it was my contention that a prudent approach to a study such as this would be allowing myself a great deal of flexibility when it came to generating a coding scheme, and identifying and defining codes and general themes in the document. This meant I routinely moved back and forth between steps so as to make amendments to my coding scheme as

my familiarity with the documents continued to evolve. Often times this entailed changing the definition of a coding category in its entirety, or subtly altering the name of a code or coding category. In a number of instances, circumstances dictated the elimination of a code altogether (due to a simple mis-estimation on my part), or the combining of two codes that were sufficiently similar to one another. Things of this nature were a common occurrence throughout my course of data analysis.

I was able to identify and define codes and coding categories as a result of my persistent immersion in the documents. After going through each a number of times, I began to see reoccurring themes, and began to form what would eventually become broad-based coding categories. Of course, not all of these over-arching themes were immediately identifiable, and as I began to make notes and code the documents, categories were added, subtracted, and combined in such a way that datum points (usually words and phrases) could be grouped in an explicable fashion. Therefore, as I generated codes, I simultaneously formed coding categories, and vice versa. Here, it should be noted that in a number of instances, I assigned various words or phrasings in the documents to more than one code. This was a relatively common occurrence due to the nature of word and phrase meanings, and the particular set of codes that arose from document analysis. I included this explanation to highlight the notion that my process involved a great deal of thought, persistence, and scrutiny of my own methods. This called for consistent self-monitoring, evaluation of the coding scheme, and backtracking to prior steps during data analysis. I feel this was truly the most

effective way to proceed with this research. In this way, I believe I was able to produce a coding scheme that brings forth the dominant themes present in the body of text. The following section will give a detailed summary of the coding categories and overall themes I created from the textual data.

Coding Categories and Codes

Through the course of document analysis, I identified six general thematic groups, each containing a variety of codes that give specificity and substance to the coding categories. Those are *Notable Performances, Potential for Future Success, Elite Status, Carding Limitations, Training Environment, and Coaching.* Each of these coding categories contains 2-3 codes that represent salient trends that I found in the text. This section will provide an overview and detailed explanations of each of these general themes, definitions with respect to their presence in the text, and the codes encompassed in each. Further, a definition and detailed description will be provided for each code, along with their degrees of incidence in the text, and sometimes their proximity to one another. For example, one code might, predominantly, appear in the documents alongside another code. Through extensive tracking and recording, I was able to find a number of such patterns. The following sections list the general themes in the documents, with each including an in-depth description of the codes contained within them.

Notable Performances. A reoccurring theme in the AAP Policy documents pertaining to athletes' worthiness of receiving funding was athletic performances that are seen as noteworthy by NTC committee members, or any decision maker in the Sport Canada network. Notable performances are stated in

the documents as performance marks that are deserving of attention based on the specific qualities of an athlete, or benchmark standards that are indicative of a superior performance. Correspondingly, the codes included in this category are as follows:

Personal Best Achievement (PB) of an athlete is indicative of a performance mark that exceeded anything accomplished to that point. PB was coded in the documents a total of nine times, with all instances occurring in Appendix V which details the 'Prioritized Ranking System'. Consistent in each of the carding years, performance points toward a minimum point total required for carding are detailed here, with 10, 5, or 2 points granted to athletes depending on how recent they achieved a personal best in their event. For each potential point quantity, only an outdoor personal best is considered worthy of points.

Achievement of Performance Standard (ST) was coded when the document denoted an athlete equalling or bettering the minimum performance required to attain or retain carding status. I identified the code ST on 20 different occasions across the three documents, predominating in the aforementioned 'Prioritized Ranking System'. Here, performance marks are delineated into the categories A, B, C, and D, which correspond to the point totals 40, 30, 20, and 10. These values contribute to carding judgments in the ranking system. AAP Policy documents 2012-13 and 2013-14 include a further ST code in Appendix 5, stating that only in an athlete's primary event can point totals be assigned to that athlete. Ostensibly, this means athletes are unable to include points accrued in other events toward their totals. A further ST code was identified in both 2012-13 and

2013-14 policy documents, limiting medical and injury cards to athletes who achieved, minimally, the C-performance standard for their event. Finally, it is worthy of note that all performance standards are consistent across the 3 years of documents (archival information was obtained through AC and Sport Canada). Here, the only incongruency was the omission of 4x100m and 4x400m relay events for both 2012-13 and 2013-14 documents.

Age-Related Performances (AG) is a code that I found throughout the documents, referring to the quality of performance marks done by athletes relative to their age. AG was found in the documents a total of 14 times, and was most present in the 'Prioritized Ranking System' outlined in Appendix V. Here, performance points awarded are contingent on the age of the athlete, with greater leniency granted to younger, developing athletes. This is the case for B, C, and D standards across all events, but not the A standards. Therefore, there is no age-related A-standard in any track and field event. Since only one example event is listed in each appendix, I consulted AC and Sport Canada archives to verify this for every event. Further age-dependent carding criteria appear under the sub-headings 'Development Cards', stating limitations on eligible recipients of them. This particular passage is only relevant to athletes at or below the junior level, or a maximum of three years post junior (age 22).

Potential for Future Success. A second notable and reoccurring theme in terms of carding criteria for athletes is their deemed potential for future athletic glory. Throughout the documents, this theme appears in the form of statements that refer to the development and identification of future elite performers and/or

already established performers who purportedly possess the potential to succeed at the international level. This category contains two codes: the first, *Potential to Become a Top Performer* (PP) was coded throughout the documents, and was noted when a statement or phrase regarding an athlete's potential to advance to an elite level appeared. I coded PP on 19 occasions across the 3 documents, most notably on the first page of each under the heading 'General program description and purpose'. Listed under this heading are two governing program mandates that guide funding practices under AAP Policy, with the second stating that AC targets athletes who are progressing towards success in major international competitions. This code was also assigned in instances where the document states explicitly the conditions under which an athlete can retain their current carding and/or are on the path to an international card (the highest carding rank).

Age-Related Performances (AG) appears in this category as well, In addition to its inclusion in the 'Notable Performances' category, and refers to the quality of an athlete's performance relative to his/her age. As detailed in the Appendix V and other areas of the documents, younger athletes are permitted more manageable performance standards than established senior-level competitors, allowing them to enter the system and develop under the supervision of AC. It seems these individuals are seen as valuable, with potential for future success.

Elite Status. A further theme I derived from the documents is the recurrent mentioning of the 'elite status' of athletes in the context of carding criteria and worthiness of funding. Generally, this category references individuals

who are already established performers in their discipline, warranting

consideration for funding, and potentially, extra attention and resources. In terms

of carding viability, this category contains 3 basic codes: *International Success*

(IN) was coded in text referring to athletes' success (or predicted success) in

international competitions such as the world championships in track and field, or

Olympic Games. This was a predominating code in the documents that stressed

the importance of athletes demonstrating their ability to, or the potential to,

succeed at the international level. This code co-occurred with a number of others,

most commonly PP (performance potential), HP (high performance), and in the

most recent two documents, criteria relating to Coaching (CI or CS).

 Established Card for the Athlete (E) was code I identified in the

documents as funding criteria for athletes who are already receiving carding.

Though E was only coded a total of 12 times in the policy, it was recorded in

instances where policy indicates that in the absence of all other criteria, athletes

can be considered to be in the carding pool on the simple basis that they already

hold a card. This code is also mentioned in the context of injuries and injury cards

awarded to athletes qualifying for such benefits. This will be discussed further in

the final chapter.

 Lastly, *High Performance* (HP) denoted an athlete's purported ability to

finish within the top-8 competitors at a senior level international competition like

the world championships in athletics. Additionally, I assigned this code in

instances where AC's 'high performance programming' was mentioned, or as was

the case in 2011-12, targeted 'Team 12 athletes'. The latter criterion did not

appear in the subsequent years of documents. HP was identified in the documents on 25 occasions, and most commonly, the 2011-12 AAP Policy document. It co-occurred with IN (International Success) most commonly, which makes intuitive sense as ideally, high performance athletes should have some success on the international stage. Fittingly, these codes often appear together. As a side-note, the 2011-12 AAP Policy document contains a full appendix on what constitutes a high performance athlete, as well as a list of those identified as being worthy of this consideration. A possible explanation for this will appear in the discussion chapter.

      Carding Limitations. In addition to criteria that outline the conditions under which an athlete is eligible for carding, the AAP Policy documents have an abundance of tenets that impose limitations on athletes with regard to their carding viability. This category has two codes: the first, *General Limitations* (L) was one I identified a total of 15 times across the three policy documents. Contrary to the additional coding categories in this chapter, I coded L in instances where the document describes conditions limiting an athlete's carding viability. These include time constraints, general carding eligibility constraints (years, types of cards etc.), raw numbers of cards available and AC financial constraints. L generally was assigned in areas of the document that describe the nature of the carding process (AC, Sport Canada etc.), and in sections that provide detailed guidelines of carding eligibility and levels of carding.

      The second carding limitation, *Injuries* (J) was identified, on 9 occasions, when carding criteria described conditions under which an athlete is eligible for

an 'injury card' (physicians assessment, therapy plan etc.), or restrictions that curb this process. Frequently, Codes J and L co-occur in the documents, and one could surmise that the injury code is, in fact, a general limitation as well. I felt that delineating these categories stressed the importance, and multi-variable nature of AC's granting of this type of funding.

Training Environment. Various conditions of training environment are mentioned throughout AAP Policy documents as being integral conditions to an athlete's carding worthiness. As pertaining to carding criteria, the category 'training environment' is referred to in situations of external, non-human conditions that contribute (or subtract from) athletes' funding worthiness. I coded Training Environment in two ways: *Training Centers* (AC), found nine times in the documents, was noted when any mention of an athlete's affiliation to, or presence at an AC nationally sanctioned training center occurred in reference to carding protocols. Training centers were mentioned most in the 2011-12 AAP Policy document, and weighed heavily in the aforementioned 'Prioritized Ranking System', evaluating funding worthiness across a number of dimensions and awarding points accordingly. According to the document, an athletes' presence at an official AC training center can account for up to 1/3 of their total points toward carding. The code HP (High Performance) most commonly occurred in tandem with AC, as did codes in the 'Coaching' category that will be summarized in the next section. It is worthy of note that both subsequent documents (2012-13 and 2013-14) have no mention of national training centers in their points system, but

rather, substitute these criteria with variables related to coaching. This will be discussed in greater detail in chapter six.

The second code in this category, *Training and Competition Plan* (TP) was coded to identify instances in text when athletes' comprehensive and detailed approach to training was mentioned. Appearing 6 times across the documents, I found TP in a variety of places. Under 'Medical/Injury Cards', a 'training program' is required as assessment criteria for granting injury cards to athletes. Subsequent codings of TP were in reference to coaches and their overseeing of a training and competition program, ostensibly written by them. In sum, it is worthy of note that the code TP bears a relationship to 'Coaching', the next general theme in the document.

Coaching. A common theme that, it seems, AC deems integral to determining athletes' worthiness of carding is coaching. Though the coding of coaching related parameters was common throughout the documents, interestingly, I found no mention of the strength or reputation of a coach in the 2011-12 AAP Policy document. Rather, the parallel section in this document makes reference to training conditions as crucial to carding consideration. Nonetheless, the overarching idea of the coach's role was salient across all documents. As a common theme in the documents, coaching was coded in two ways: *Coaching Involvement* (CR) was identified when words or phrases described situations necessitating the supervision of the athlete's primary coach. Such instances include the role of the coach in athlete carding recommendations to AC, approval of injury cards for their athletes, and when NCAA cards are

considered. CR co-occurred most commonly with codes J (Injuries) and L (General Limitations). In total, CR was coded 23 times across the 3 policy documents.

The second coaching code, *Coaching Success* (CS), was identified when words or phrases that explicitly mention the reputation, credentials, or prowess of an athlete's primary coach. As I alluded to earlier, I only noted this code in the 2012-13 and 2013-14 documents, and it did not appear in the earliest document in any form. In the latter two documents, CS was significant in the 'Prioritized Ranking System' under the heading 'Training Environment', with points awarded to athletes based on their coach's credentials and success on the international stage. In the two documents, this accounted for 20 points of a possible 100 an athlete might accrue toward funding consideration. Throughout the two documents, CS was coded 14 times in total, primarily in close proximity to IN (International Success), as the international success of a coach is given credence in both years of policy.

The coding of CS (Coaching Success) in the 2012-13 and 2013-14 policy documents vs. AC (Training Center) in 2011-12 represents a fundamental difference in the documents that immediately came to my attention after reading them several times. Though many of the differences between policy years involve subtle wording of little consequences, it was imperative to distinguish between these and the minute differences that are key to the interpretation of the policies. These differences will be expanded on in the following section.

Differences Between Policy Documents

It cannot be denied that the 2011-12, 2012-13, and 2013-14 AAP Policy documents bear a great deal of similarities with one another. In fact, I believe if an average individual were to breeze through the documents in succession, the majority of the differences might be indiscernible. Certainly, this is a plausible scenario due to the subtle nature of the changes that took place between document years, and the structural similarities among them. During the initial steps I took to familiarize myself with the documents, it became clear to me that AC not only made minor, almost inconsequential wording changes, but took steps toward a shift in value judgments toward the carding of athletes. Furthermore, after a thorough analysis of AC's funding policies, these differences became more pronounced, and had more substance. The general ways in which policy changes appear in the documents come in the form of specificity and carding constraints, Olympic cycles, and training environment and coaching. It was my observation that the changes made in document years were methodical, and made with concerted efforts from policy makers to create changes year by year. As I stated earlier in this chapter, the differences between the documents were my first step in data analysis. This was due to the simple fact that their identification allowed me to focus on one document for coding purposes, and when I came upon a coded difference, I could shift to either policy document to see the changes made. The following section will describe and summarize these changes with specific examples from the documents. For the sake of expedience, I will commonly refer

to the 2011-12, 2012-13, and 2013-14 policy documents as documents 1, 2, and 3 respectively.

Specificity and Carding Constraints

Due to the inclusion and specificity of wording as well as more numerous policy guidelines, AAP Policy was found to be increasingly strict according to how recent the document was published. Generally speaking (with a few exceptions), document 2 provides a more limiting criteria set for funding than document 1, and correspondingly, document 3 with stricter guidelines than its two predecessors. This stringency in carding practice, as I alluded to earlier, predominantly comes in the form of additional criteria imposed on athletes, or purposeful clarification of wording to eliminate room for interpretation and flexibility of policy guidelines. A pertinent example here is on the second page of each document under the general 'Eligibility Criteria' for an athlete to receive funding. Where the 2011-12 document does not, the more recent documents provides an additional criterion under this heading, stating an athlete must submit a formal training and competition plan to AC.

An additional, and notable difference in the documents appears on the second page of each, under the heading 'Allocation of Cards'. In this section, documents 1 and 2 denote the number of cards allocated in a given carding cycle, as well as how that number can be broken down into various levels of cards (senior, developmental etc.). Interestingly, the information provided in the document 3 only outlines the total carding budget in dollars, giving no information on the number of cards or delineating levels of carding.

Finally, the appendices in the documents reflect specific changes that limit and clarify athlete carding policy. Appendix I entitled 'Categories of Cards', has a variety of important differences that exist from document to document. First, under the sub-heading 'NCAA Cards', documents 2 and 3 explicitly state the conditions under which a college athlete can file for an injury exemption for carding. This is absent in the 2011-12 document. Further, under the separate sub-heading 'Medical and Injury Cards', the second and third documents impose two additional criteria on athletes, stating: 1) A maximum of two injury cards for a senior level athlete; and 2) NCAA athletes are not allowed to receive injury cards. Additionally, the 'Prioritized Ranking System' summarized in Appendix V imposes a narrower scope in document 3, allotting 30 fewer days for athletes to achieve performance standards. Lastly, the ranking system in Appendix V makes particular mention of an athlete's 'primary' coach as the determiner of points awarded. Therefore, any other individual assisting in coaching that athlete could not be considered toward their point total in this category. As a thorough description of all differences that exist between the documents would be time-consuming and potentially redundant, I will reserve further details on the matter for the next chapter.

Olympic Cycles

During the course of my analysis of carding policy documents, I made the observation that the differences were more pronounced in 2011-12 carding policy than the following two seasons. Through the process of coding and becoming increasingly familiar with the documents, I observed that this marked difference

in the 2011-12 carding protocols may have come as a result of the approaching 2012 London Olympics, and an emphasis on high performance and a presence that the Games. To this end, the 2011-12 AAP Policy makes explicit reference to athlete performances, high performance, and targeted 'Team 2012 athletes' for which a separate appendix is attached detailing the requirements to be considered as one, and a list of the athletes who belong to this group.

As part of the 'High Performance Olympic Program', these targeted athletes are afforded additional benefits in the form of travel to international competitions, extended warm weather and altitude training camps, and enhanced medical services. The document also states that athletes belonging to this program are selected at the sole discretion of AC's coaching staff, and must have a Top-12 world ranking and the IAAF 'A' standard for their event. In sum, the implication made in the document (albeit not explicitly stated) is that in order to supplement carding dollars, AC provided additional funds to targeted athletes due to an increased emphasis on performance in an Olympic year.

Apart from Appendix 4 and its 'High Performance' document, 2011-12 carding policy makes reference to the 2012 Olympics and high performance protocols in other areas. Namely, Appendix 3 details the mandate of 'National High Performance Training Centers' leading up to the London Olympics in 2012. The stipulated criteria in this mandate include producing athletes capable of finishing in the top-8 in the Olympics, and to develop and implement related strategies for the development of athletes and coaches leading towards the 2016 Games in Rio de Janeiro. Both of these points reflect the emphasis of the

document, which is high performance in upcoming and future Olympic Games. Documents 2 and 3 make no mention of special circumstances leading up to the Olympics, or the high performance targeting of select athletes.

Training Environment and Coaching

The most readily apparent, and perhaps significant change made by AC between documents is carding criteria related to training environment. Though I observed subtle (and relatively insignificant) wording differences between documents 2 and 3, a major shift in policy seems to have occurred after document 1, leading up to the 2012-13 carding cycle and beyond. These changes appear in the form of policy initiatives that directed the emphasis from athletes' training centers and Athletics Canada's involvement toward the integral role of the coach in a training environment. A significant proportion of policy-related differences in the documents are related to this value shift, which is most evident in the 'Prioritized Ranking System' outlined in Appendix V, in addition to wording changes made from documents 1 to 2 (that stay consistent in document 3). I found these differences in wording to occur throughout the documents, often in areas that describe what constitutes carding worthiness.

The first instance where evidence of this transition was identified in the documents was in a third page text box under the title 'Important Notice'. Here, document 1 states the importance of AC's National High Performance Training Centers, with athletes' presence at these locations being critical to the aforementioned 'Prioritized Ranking System'. Correspondingly, the fourth point in Appendix 5, labeled 'Training Environment' details the point values awarded

to athletes, with 35-40 awarded to AC Centre-based athletes, and 25-30 granted to AC Centre-linked athletes. Lower point totals are awarded to athletes without center affiliation, with 15-20 and 5-10 awarded to athletes with full-time and part-time coaches, respectively.

The 'Prioritized Ranking System' in documents 2 and 3 shows a significant shift in the ways in which points are awarded to athletes under the category 'Training Environment'. Here, descending point quantities are awarded to athletes as a function of their coaches' past successes on the international stage. Here, 20, 15, 10, and 5 points are assigned on the basis of their coaches' presence at international competitions, and how the athletes have fared at those competitions. It is worthy of note that with respect to the points system, the importance placed on an athlete's training environment decreased by half from document 1 to documents 2 and 3. I will discuss this change further in the next chapter.

A number of further differences in reference to training environment and coaching were identified in the documents. A notable area where this was the case appears in text on the third page of each of the AAP Policies, under the banner 'Important Notice'. I mention this occasion in particular because, ostensibly, a labeling of this kind should represent precisely what it states, that the proceeding text is an important policy directive, or at least of some significance. Under this heading and the text that follows, document 1 highlights the importance of athletes' affiliation with AC training centers, an obligation athletes must fulfil to maintain their carding status. In their parallel sections, documents 2 and 3 stress

the importance of proven coaches and their history of success as a key factor in an athlete's training environment. Certainly, this represents a major difference that I identified between the documents, and I what I would deem an unequivocal shift in carding policy in Athletics Canada. This will be elaborated on in the discussion section.

Conclusion

The process of analyzing and coding the 2011-12, 2012-13, and 2013-14 AAP Policy documents allowed me to identify a number of common themes that existed in and among the written text in each. These trends in the documents were recognized and classified in the form of coding categories, each containing codes that fit into the overarching category to which they were assigned. I feel this was a crucial task, as naming and defining both codes and overall themes had the function of allowing me to conveniently refer back to my literature review (chapter two) with simple code words rather than long segments of text. In essence, codes and coding categories that I produced permitted me to neatly package up prevailing themes in the documents, and thusly, relate them to the extant literature. Since the purpose of this study is to examine the nature of carding practices and talent identification in AC, a content analysis allowed me a clearer and richer perspective.

The coding procedures I followed in this study resulted in five overarching themes: Notable Performances, Potential for Future Success, Elite Status, Training Environment, and Coaching represent these broad categories, with each capturing a total of 13 different codes (Age-Related Performances (AG) is

appears in two categories). The creation of a code indicated its repeated and meaningful presence in the text, and a relationship to carding criteria in the AAP documents. I engaged in such a practice with the hope of providing depth to the principles and processes adopted by AC toward granting carding to track and field athletes.

Finally, identifying the differences between the documents meant making three separate comparisons, that is, document 1 to 2, 2 to 3, and 1 to 3. Completing this task not only gave me insight into the dynamic nature carding protocols, but provided insight into possible explanations for these changes. Additionally, this initial process allowed me to form some preliminary codes, and gave me an overall flavour of the documents and the locations of key carding criteria. For example, when comparing documents 2 and 3, I observed how similar they were, making the subsequent coding process much easier.

The next chapter will give a detailed explanation of the coded documents and what my findings mean when considered with the body of literature that exists on talent identification. Through a thorough interpretation of my results, I will have the ability to convey the potential significance of my findings, and the real world applicability of a study such as this. It is my aim to communicate the importance of this line of research with a great deal of depth and coherency, with meaningful language.

Chapter 5: Athlete Carding Analysis

Introduction

Thus far, I have discussed talent identification as a multidimensional construct in sport science, and looked at the practical application of TI in regard to athlete carding practices in Canadian track and field. The degree to which Athletics Canada has empirically supported practices, or those that utilize sport science literature, was the primary target of this study as there is a great deal of utility in exploring new and innovative ways to cultivate and nurture talent. Appropriately, a thorough examination of the degree to which AC's approach to carding is in line with a 'science-based' rationale will take place in chapter six.

This chapter will bring my study a step further, charting the athletes who received carding for all three document years, and comparing each athlete to the codes I produced from documents pertaining to funding procedures. In compiling this athlete talent pool and weighing each individual against common themes in the documents, my aim was to develop an understanding of how closely AC stays true to their own carding policies. Central to this question is an issue of ethical importance, as presumably, athletes should be funded according to the policy directives stated explicitly in the documents. I feel the thematic content I drew from the documents provided me with a comprehensive and reliable data set that allowed me to move forward with this line of reasoning.

Sample of Athletes

Tables 5.1, 5.2, and 5.3 show a sample of 38 athletes in no particular order, listed on the table's left column. The sample of athletes includes 18 males

and 20 females, with at least one competitor in every track and field event present in the sample. Codes I created from the documents are listed on the horizontal axis in the tables, with each applied to every athlete in the sample (in a number of cases this was impossible as there was no data available for select athletes for various codes). As stated in chapter four, I coded the three AAP Policy documents together and not as separate entities, and thus, only athletes carded for each of the first two document years could be applied to this part of my analysis. Since documents two and three are very similar (and I coded them as such), I felt this was a logical course of action as all codes derived from the documents could be applied to every athlete chosen, without the requirement they be carded for 2013-14. For example, if Athlete A were only carded for the 2011-12 season, any salient themes or codes only present in documents two and three could not be applied to that athlete, thereby invaliding the athlete's inclusion in the table.

Codes Applied to the Athlete Sample

To evaluate how closely AC follows their own carding guidelines, I found it necessary to apply all relevant codes to the sample of athletes I investigated. Of course, a number of salient themes present in the documents could not be reasonably applied to the athlete sample, as it was simply not a feasible task to collect such data. For example, I was unable to use Training and Competition Plan (TP) in the table because there was no way I could be privy to such information, unless of course I was directly involved in the planning of athletes' schedules. Further, Coaching Involvement (CI) was a code that had no bearing here, as I found it in the documents when situations dictated the involvement of

an athlete's primary coach. Only an athlete could stake a claim on the degree to which his/her coach played a role in the training environment, or recommendations toward carding. Additionally, I was unable to apply the coding category 'Carding Limitations' to this process. Since General Limitations (GL) specifies conditions that would diminish an athlete's carding viability, I would have required a list of athletes who were part of the carding pool but denied funding for each of the policy years. Finally, Injuries (J) would require intimate knowledge of all athletes' physical morbidities, and a list of those who were granted and denied injury cards during the three carding cycles. This information is not part of the public record. A detailed discussion toward the significance of this data will appear in the final chapter of this study.

Table 5.1

Carded Athletes Assessed for Training Center, Coaching Success, and Age-Related Performance Codes

Athlete	Training Center (TC)	Coaching Success (CS)	Age-Related Performance (AG)
Dylan Armstrong	Kamloops, B.C.	Yes	n/a
Jared Connaughton	Arlington, TX	Yes	n/a
Elizabeth Gleadle	Lethbridge, AB	Yes	Yes
Nikkita Holder	Toronto, ON	Yes	Yes
Ruki Abdulai	Coquitlam, BC	No	n/a
Perdita Felicien	Calgary, AB	Yes	n/a
Gavin Smellie	Ottawa, ON	Yes	n/a
Phylicia George	Toronto, ON	Yes	Yes
Hilary Stellingwerff	Guelph, ON	Yes	n/a
Inaki Gomez	Vancouver, BC	Yes	Yes
Damian Warner	London, ON	One national team	Yes
Justyn Warner	Norman, OK	Yes	Yes
Jessica Zelinka	Montreal, PQ	Yes	n/a
Kyle Nielsen	Langley, BC	Some Int'l experience	Yes
Nathan Brannen	Tallahasse, FL	Yes	n/a
Crystal Emmanuel	Toronto, ON	Yes	Yes

Sultana Frizell	Kamloops, BC	Yes	n/a
Alex Genest	Guelph, ON	Yes	Yes
Eric Gillis	Guelph, ON	Yes	n/a
Melanie Blouin	Quebec City, QC	Yes	Yes
Tremaine Harris	Toronto, ON	Yes	Yes
Priscilla Lopes-Schliep	Toronto, ON	Yes	n/a
Olawasegun Makinde	Ottawa, ON	Yes	Yes
Jenna Martin	not available	not available	Yes
Helen Crofts	Vancouver, BC	Yes	Yes
Justin Rodhe	Kamloops, BC	Yes	Yes
Heather Steacey	Lethbridge, AB	Yes	Yes
Sarah Wells	Toronto, ON	Minor Int'l experience	Yes
Angela Whyte	Des Moines, ID	No	n/a
Dylan Wykes	Victoria, BC	Yes	n/a
Aaron Brown	Toronto, ON	No	Yes
Ashlea Maddex	Ottawa, ON	No	Yes
Julie Labonte	Tuscon, AZ	No	Yes
Taylor Stewart	London, ON	No	Yes
Rachel Machin	Calgary, AB	Yes	Yes
Rachael McIntosh	Calgary, AB	Yes	Yes
Tim Nedow	Kamloops, BC	Yes	Yes
Philip Osei	Toronto, ON	No	Yes

Table 5.2

Carded Athletes Assessed for High Performance, International Success, and Established Card Codes

Athlete	High Performance (HP)	International Success (IN)	Established Card (E)
Dylan Armstrong	World Top 8	World Medallist	Yes
Jared Connaughton	Relay Top 8	Olympic Semi-Final	Yes
Elizabeth Gleadle	No	No	Yes
Nikkita Holder	No	Olympic Semi-Final	Yes
Ruki Abdulai	No	World Champs Appearance	Yes
Perdita Felicien	World Top 10	World Champion	Yes
Gavin Smellie	Relay Top 8	Relay Finalist	No
Phylicia George	No	Olympic Semi-FInal	Yes
Hilary Stellingwerff	No	Olympic Semi-Final	Yes
Inaki Gomez	No	Olympic Final	Yes
Damian Warner	World Top 5	Olympic Final	Yes

Justyn Warner	No	Olympic Semi-Final	Yes
Jessica Zelinka	World Top 10	Olympic Final	Yes
Kyle Nielsen	No	No	Yes
Nathan Brannen	No	Olympic Semi-Final	Yes
Crystal Emmanuel	No	Relay Finalist	Yes
Sultana Frizell	No	Olympic Appearance	Yes
Alex Genest	No	Worlds Final	Yes
Eric Gillis	No	Olympic Marathon 22nd	Yes
Melanie Blouin	No	Olympic Appearance	No
Tremaine Harris	No	Olympic Appearance	No
Priscilla Lopes-Schliep	Oly/World Medallist	Olympic Medallist	Yes
Olawasegun Makinde	No	No	Yes
Jenna Martin	No	Olympic Appearance	Yes
Helen Crofts	No	No	Yes
Justin Rodhe	No	No	Yes
Heather Steacey	No	Olympic Appearance	Yes
Sarah Wells	No	Olympic Semi-Final	Yes
Angela Whyte	Oly Final/World ranked	Olympic FInal	Yes
Dylan Wykes	No	Olympic Marathon 20th	Yes
Aaron Brown	No	Olympic Semi-Final	Yes
Ashlea Maddex	No	No	Yes
Julie Labonte	No	Olympic Appearance	Yes
Taylor Stewart	No	No	Yes
Rachel Machin	No	No	No
Rachael McIntosh	No	No	Yes
Tim Nedow	No	Word Champs Appearance	No
Philip Osei	No	No	No

Table 5.3

Carded Athletes Assessed for Personal Best, Performance Standards, and Potential to Progress to Elite Status Codes

Athlete	Personal Best (PB)	Performance Standards (ST)	Potential to Progress (PP)
Dylan Armstrong	2011	Yes	n/a
Jared Connaughton	2012	Yes	n/a
Elizabeth Gleadle	2011, 2012	Yes	Yes
Nikkita Holder	2012	Yes	Yes
Ruki Abdulai	2011	Yes	Data suggests No

Perdita Felicien	No	Yes	n/a
Gavin Smellie	2012	Yes	Data Suggests No
Phylicia George	2012	Yes	Undetermined
Hilary Stellingwerff	2012	Yes	Data suggests No
Inaki Gomez	2010, 2011	Yes	Data suggests No
Damian Warner	2011, 2012	Yes	Yes
Justyn Warner	2012	Yes	Undetermined
Jessica Zelinka	2012	Yes	Data suggests No
Kyle Nielsen	2010, 2011	Yes	Data suggests No
Nathan Brannen	2012	Yes	Data suggests No
Crystal Emmanuel	2011, 2012	Yes	Undetermined
Sultana Frizell	No	Yes	Yes
Alex Genest	2011	Yes	Data suggests No
Eric Gillis	2011	Yes	Data suggests No
Melanie Blouin	2010, 2011, 2012	Yes	Data suggests No
Tremaine Harris	2012	Yes	Yes
Priscilla Lopes-Schliep	2010	Yes	Yes
Olawasegun Makinde	2012, 2013	Yes	Yes
Jenna Martin	2012	Yes	Data suggests No
Helen Crofts	2010, 2011	Yes	Undetermined
Justin Rodhe	2012, 2013	Yes	Yes
Heather Steacey	2011, 2012	Yes	Data suggests No
Sarah Wells	2012	Yes	Data suggests No
Angela Whyte	2012	Yes	Yes
Dylan Wykes	2011, 2012	Yes	Data suggests No
Aaron Brown	2011, 2012	Yes	Yes
Ashlea Maddex	2010, 2011, 2012	No	Yes
Julie Labonte	2011	Yes	Data suggests No
Taylor Stewart	2010, 2012	Yes	Undetermined
Rachel Machin	No	not available	Undetermined
Rachael McIntosh	2011, 2012	Yes	Data suggests No
Tim Nedow	2011, 2012	Yes	Yes
Philip Osei	2011, 2012	Yes	Data suggests No

Codes and Table Logistics

Consequently, I was able to apply a total of nine codes to the sample of 38 athletes included in the tables. Training Center (TC), Coaching Success (CS), Age-Related Performance (AG), High Performance (HP), International Success

(IN), Established Card (E), Personal Best (PB), Performance Standards (ST), and Potential to Progress to Elite Status (PP). With respect to all athletes in the tables, I assigned each code a color scheme to signify the degree to which the athlete is consistent with that code. As such, green is indicative of an athlete's profile fully coinciding with a code, with yellow indicating partial adherence, and red signifying none. Often, a specific word or phrase was included under certain codes, predominantly for the sake of clarification in instances where there was a degree of ambiguity. Typically, I applied these qualifying remarks when the color yellow was labeled, as partial adherence might occur in varying degrees. The following sub-sections will describe the codes I included in the table, and the frequency at which the athletes full coincided, partially coincided, and failed to meet the criteria for each.

Training Centers

Of crucial consideration in the 2011-12 AAP Policy document, this carding criterion specifies that athletes must have their central training bases at National Training Centers (NTCs) to be eligible for the 'training environment' points toward funding. Of the 38 athletes I included in the sample, 23 were given a 'green' rating, indicating their presence at a sanctioned AC training center. Further, I was able to assign a yellow 'partial adherence' label to this carding mandate six times in total. Listed in Table 5.1, yellow is indicative of an athlete's presence in a major center located near an NTC (Vancouver, for example) or an area with a deep talent pool and competent coaches for that athlete's event group (ex. Guelph distance running). On nine occasions, I assigned a red code for non-

compliance with this carding criterion. Generally, carded athletes in Canada seem to conform to this guideline, or at minimum, make informed decisions toward their training bases.

Coaching Success

The second code I was able to apply to this athlete sample, and of great importance in the documents, is Coaching Success (CS). As is explicitly stated in the documents, and to be coded as green in Table 5.1, this refers to a coach's history of consistently producing athletes who compete in major international competitions. Uniformly, athletes coded as green under the TC category were all coded green under this heading, which makes intuitive sense as professional coaches employed at NTCs should possess credentials that include success on the international stage. Of the athletes I included in this sample, 27 had coaches that met the criteria specified in the documents, with four coded as yellow, and seven as red. Here, an athlete receiving a yellow code and partially fulfilling this criteria means the athlete's coach has had limited experience on the international scene, but has brought at least one athlete to an international competition. Red indicates a complete absence of international experience.

Age-Related Performance

Age-Related Performance was applied to all athletes in the sample who met the minimum age-dependent criteria to be granted a card. I was able to determine which athletes in the sample met the reduced standards for funding by referring to archival data detailing the age-based performance marks necessary for

funding. Generally, these marks increase as athletes age, with standards becoming fixed between ages 26 and 28, depending on the event. Therefore, any athlete over the maximum event-relative funding age could not be included in the sample, and was assigned a yellow code marked 'not applicable' (n/a). Any athlete who met the minimum performance standard for their age and event, falling under the maximum cut-off age I gave a green label. No athlete included in this code failed to meet the minimum performance mark, and therefore, all athletes were given an 'n/a' yellow code, or a green code. In total, 26 athletes were funded based on age-related criteria in some capacity. This information is included in Table 5.1.

High Performance

As a dominant theme that I identified primarily in the 2011-12 AAP Policy document, High Performance is seen by AC as an athlete ranked in the world top-12 with the IAAF A-standard in his/her primary event. This was taken straight from the 'High Performance Olympic Program' document that came as part of the 2011-12 AAP policy. Using a concrete definition such as this meant avoiding any 'partial compliance' yellow codes in the table, as an athlete either met this criteria or did not. Of the 38 athletes included in the sample, 6 met the criteria for high performance, with 32 failing to in this respect. It should be noted that it is not an adverse finding that a great proportion of athletes in the sample were labeled red. As I mentioned in the previous chapter, individuals classified as high performance, according to the document, are afforded supplementary funding and training benefits in addition to standard carding funds. This information is included in Table 5.2.

International Success

The second column in Table 5.2, International Success, is a code I used to identify any athlete who has reached the semi-final at either the IAAF World Championships or the Olympic Games. Both of these international events are listed in repetition throughout the AAP Policy documents, and are seemingly a major focal point of funding procedures. My decision to impose the requirement of a semi-final appearance for athletes included in this category rested on the notion that 'success' on the international stage means advancing to the latter stage of a competition. To this end, athletes who were able to do so were labeled green, with those who qualified for these major championships without advancing assigned yellow. In total, 16 athletes were deemed to fit the 'International Success' criteria, with 12 partially meeting the requirements, and 10 failing to do so.

Established Card

Established Card appears as the final column in Table 5.2. Athletes who met this criteria were those that had received carding prior to the release of the documents I coded in this study. Each of them, independent of any carding requirements stated in the documents, were included in the carding pool as athletes who currently held a card. Of the 38 athletes being assessed, 32 were carded during the previous carding cycle (2010-11), with six given a red label as newly funded athletes. I was not able to assign a yellow label for this code as there is no middle ground between 'carded' and 'not carded'.

Personal Best

An athlete's 'Personal Best' is the next code I included in Table 5.3, and applies to athletes who achieved a personal best in the year prior to the first document under study, and the two subsequent seasons (for all of 2010-11, 2011-12, and 2012-13). This allowed me to apply a personal best achievement to each carding document, as the season prior to each document determines if a personal best is applied to that carding cycle. Along with color codes, the table includes the specific years during which each athlete had a personal best performance, with a minimum of one personal best for each carding year being given a green label. No personal bests prior to any policy year were assigned a red label in the table, with no yellow labels given. In total, only 3 athletes were without a personal best performance during the listed seasons, with 35 achieving at least one personal best during that period.

Performance Standard

I included the code 'Performance Standard' due to its frequent appearance, and relative importance in the documents. Overall, 36 of 38 athletes achieved performance standards and received a green label for all three policy documents. In the sample, there was no data available on one athlete (my assumption is that the athlete was not a registered member of Athletics Canada or her provincial governing body, omitting her results), who I gave a 'data not available' yellow label, with the second athlete not meeting the performance standards set forth in the 2013-14 policy document. Notably, this athlete achieved a would-be acceptable performance mark that was 'wind-aided' for her event, meaning the

wind-assisting her performance was over the allowable limit of 2.0m/s. According to AC policy, this should not count toward the achievement of a performance standard in her event.

Potential to Progress to Elite Status

Lastly, I applied the Potential to Progress to Elite Status (PP) to the 38 athlete sample. A code that I identified with great frequency in the documents, PP, as it exists in Table 5.3, is an indicator of whether an athlete has the potential to progress to a top-16 world ranking, or high finish at either a world championship or Olympic Games. I included this code to reflect my own subjective appraisal of athletes' potential, as it is impossible to predict with certainty an athlete's future ability. As such, I rated athletes based on past performances, personal bests, age, and how close each has been to the top competitors in their events. Correspondingly, I assigned a green code to those who have been competitive on the international stage, are relatively young, and hold performance marks that resemble elite performers at the same age. In this category, I labeled athletes with yellow codes if they failed to meet some criteria I used as an evaluative tool, or had qualities or characteristics I felt were borderline in that respect. Further, athletes were coded with a yellow 'n/a' if they already performed at an elite level before or during the carding years under examination, or if an athlete was in the late stages of his/her career. Finally, a red code was used to designate an athlete who's performances and age were not worthy of a 'future elite performer' classification.

Conclusion

Carrying out this supplemental inquiry into athlete carding in Canadian track and field is an important aspect of this study. After evaluating AC's AAP policies and the empirical nature of their practices, I felt the next logical step was to look at the nature of their practices when it pertains to the athletes they fund, and if AC adheres to their own carding policies. The next chapter will address these issues in detail, and will consolidate and interpret the results from chapters four and five. I will look at the results of my study, examine what I have found, and explain them in detail with respect to the body of literature that exists on talent identification. Importantly, I will also address the significance of my findings in terms of AC policy and the potential for greater efficiency, effectiveness, and reform.

Chapter 6: Discussion

Introduction

Through my engagement in a thorough analysis of three years of Athletics

Canada (AC) carding documents, I routinely came across policy statements and

initiatives that applied some form or degree of a practical approach to talent

identification. Truly, the documents are rich in a variety of TI protocols, geared

toward effectively and reliably targeting individuals that AC regards as worthy of

resource allocation. Generally, these resources come in the form of funding

stipends, facility access, and national team selection, with their provisions carried

out through the use of funding procedures that consider a wide range of variables

counting toward or against an athlete. Throughout this study, I have used

variations of the term 'carding viability' to describe AC's practices in this respect,

as AAP policy documents outline ways in which athletes are considered strong

candidates for funding, as well as situations where their unique contexts might

serve as hindrances to carding. It is through my immersion and coding of these

policy documents that I was able to gain a deeper understanding of the nature of

funding provisions in AC, and effectively communicate my findings in this study.

This chapter will have a number of functions. First I will discuss, in detail,

the codes that resulted from the inductive approach I took to data collection and

category development. Following this discussion, I will describe how my findings

correspond to the body of literature on talent identification. This step is central to

my study as it directly addresses the research questions I have posed. Of course,

addressing the research question will also require me to look at the extant

literature on talent identification, and identify the areas that are absent in the AAP documents. As well, I will provide an interpretation of the differences in the documents, the purposes they serve, and possible explanations for why they are present.

Further, I will address the second part of this study that looked at athlete outcomes and whether AC adheres to their own carding mandates. Providing insight into these practices took this study a step further. Transitioning from the empirical nature of AC's practices to this type of inquiry was the next logical step in this study. In this way, the line of questioning moves from "do they ground their practices in scientific method?" to "regardless of the nature of their practices, do they actually abide by their own mandates?" Altogether, I found these questions intriguing to consider. In addition, they aided in answering questions pertaining to consistency and accuracy, toward how just funding practices are in Canadian track and field. I found this discussion of AC's adherence to their own policy provided a perfect transition into the final chapter in this study, where I will discuss the significance and implications of this research. The following section will consider the codes I derived from the policy documents in relation to talent identification literature.

AAP Policy and Talent Identification

Throughout the process and completion of my analysis of AAP policy documents, I began to see discernable relationships between the codes I derived and the talent identification literature. Often times these came in the form of the very presence of words or phrases in the text that seemed familiar to me, or came

as a result of my assignment of a definition to codes as they appear in the text. Though not all of the codes I identified can be applied to sport science research in TI, I found that each seems to play at least a minor role in talent targeting and funding frameworks. My position is that a code's lack of relationship to the scientific literature does not mean it should be dismissed as unempirical or invalid, but simply that it exists within a framework where human variables, critical thinking of policy makers, tradition, and intangible qualities carry weight. Perhaps what the literature suggests could be too cumbersome or complex to exist in a practical setting. This proposition cannot be addressed until these TI principles are put into practice.

Regardless, there do exist degrees of disconnection that I must address. I do so to provide a complete picture of funding practices in relation to talent identification as it exists in the sport science literature. First, the carding policies of AC do not entirely reflect the way TI is represented in the literature. That is, AC seems to fall short in incorporating a number of important talent identification models that exist in sport science. Alternatively, many of the codes I derived from AC carding documents are absent in the TI literature, a number of which seem to be important correlates of athletic talent and performance. It seems there is significant overlap between sport science literature and these assigned codes, and simply, a number of areas of each do not coincide with one another. The following section will explore the nature of the similarities and differences between coded documents and existing body of literature on talent identification.

Talent Identification vs. AC Policy

Physical/Anthropometric Measures. A notable instance where a TI framework that exists in the literature is absent in AC policy is in the area of physical/anthropometric athlete qualities. Though a great deal of criteria related to results and performance measures (which I shall discuss later) pertaining to specific athletes are present, not once does AAP policy refer to physical qualities in track and field athletes that bear a relationship to elite performance in specific events. As was described by Bajramovic, (2011), and Talovic, Jeleskovic, and Alic (2002), this branch of TI refers to the relationship between the structure and function of the human body, making different traits advantageous depending on the sporting discipline they are applied to. AC policy does not make reference to the physical qualities of an athlete, an interesting premise considering the disproportionately high emphasis on the physicality of an athlete in the TI literature. As I explained in chapter two, athletes' physical qualities are heavily focused on in talent identification models, often at the expense of less observable characteristics such as the context within which they train (Penney & Lisahunter, 2006; Evans, 2004). In this case, the disparity between the TI literature and the policy documents is more pronounced, as sport science highly emphasizes an athlete's physical qualities, whereas they are completely absent in practice.

As a sport science researcher, I felt it necessary to explore, and give possible explanations for this discordance between the literature and AC policy. Looking at the nature of the codes that I produced from the documents, it is apparent that the criteria AC employs is largely performance oriented, as is

evident in codes like Performance Standards (ST), Age-Related Performances (AG), High Performance (HP) etc. One could argue that all athletes that are being funded are already established athletes, and are granted carding on the basis of measurable performances relative to their peers, rather than the propensity to perform based on favorable physical traits. As I alluded to in chapter two, a scenario where the physical dimensions of talent might be considered as part of a TI program could be at the grassroots level. Here, the goal would be targeting young athletes with sport-specific physical qualities that have been shown to correlate to elite performance. In fact, conventional wisdom suggests such practices occur on a routine basis. In track and field, coaches consistently engage in informal, event-specific talent targeting based on the physical qualities of young athletes, believing that athletes fitting a prototypical body type or musculature will be easier to nurture into talented individuals. However, this is not a consistent practice, as young athletes generally follow their preferences, and dabble in a variety of disciplines before they find their strongest events or the event they prefer, e.g., a mediocre 100m runner who would very likely be more competitive at 400m. The question of whether this aids in TI and talent development might warrant further inquiry.

Certainly, incorporating physically-based athlete targeting into AC's TI protocols would require a great deal of resources, and most importantly, could not come at the expense of the current carding system. In chapter four (and more broadly in chapter two), I mentioned that the documents specify a finite number of cards and money made available by Sport Canada to AC. If dollars were

reallocated to accommodate a new TI program focused on physical characteristics, and not much changed, it would difficult to determine whether it was a success or failure. In short, I feel a grassroots physical TI program could be beneficial if it were to act as a supplement to current carding practices.

It should be noted here that physical/anthropometric TI practices could bring about ethical concerns for athletes of all ages and abilities. Though athlete assessment involving simple observation or measurement could not be considered invasive, certain forms of physiological testing, including muscle biopsy, could inflict undue harm to athlete-subjects. Ethically speaking, the benefit to the population at large would have to outweigh any harm brought on the research subject, which is certainly debatable in this case.

Psychological Measures. As a construct that is largely measured with psychometric tools, research suggests athletes often achieve peak performances through trait-based psychological strengths, or mental strategies (Abbott & Collins, 2002; Regnier, Salmela, & Russell, 1993). The extant literature on TI suggests that though psychological strategies represent an integral part of athletic potential (and subsequent performance), they seem to be underrepresented both in practice, and in the sport science literature (Kunst & Florescu, 1971). A prime example of this is in the AAP policy documents, where athletes' psychological characteristics are nowhere to be found. As a matter of fact, at no point do the documents make a note of mental skills, psychological factors, or anything of the like. The only scenarios I could suggest might include psychological traits/skills were in the codes in the category of Training Environment, which includes

Training and Competition Plan (TP) and Training Centers (TC). Though not explicitly stated in the documents, it is possible that as part of a comprehensive training regimen, national training centers might include psychological assessment, or some type of evaluation of psychological skills/deficits. Nonetheless, their absence suggested to me that it is unlikely that AC policy makers, or members of the NTC, take into account psychological strengths and strategies utilized by athletes, despite their prominence in the TI literature.

Considering the breadth of data I collected from the documents, this lack of consideration for the psyches of athletes is problematic in a number of ways. Primarily, despite psychological factors being underrepresented in the TI literature, they still make up a significant proportion of it, yet are never mentioned in the documents as part of funding procedures and athlete selection criteria. Perhaps the policy/decision makers in the system feel the inclusion of psychological criteria as part of athlete selection might be too costly, causing extra budgetary concerns in the form of sport psychologists, clinicians, or other individuals with the competency to assess athletes along these parameters. A point to be made here is that if AC did consider an athlete's psyche to be key to his/her success, they would most likely incorporate that into their carding frameworks.

Further, AC would face additional ethical concerns should they assess athletes' psychological strengths and weaknesses. Initially, athletes would be required to provide informed consent for psychometric assessment, meaning they would reserve the right to be excluded from such procedures. This could create a lack of consistency and fairness if AC adopted this practice, as consenting athletes

could conceivably be favored over non-participants, should they produce successful results that is. Additionally, some athletes (or their legal guardians) might see psychological assessment tools as overly invasive, especially if the situation arose where an athlete suffered from a traumatic past in some respect. Lastly, athletes might have the proclivity to lie during testing. Here, deception might come in the form of positive self-presentation (Leary & Kowalski, 1990), especially since each subject would probably be aware of the implications of an adverse finding during testing.

I feel that incorporating a psychological component to athlete selection would present a variety of challenges, many of which could be overcome by increased funding dollars to AC, or a keen understanding of the potential ethical issues that accompany psychological assessment. Despite these challenges, I feel it is crucial for sporting organizations to include psychological characteristics as part of talent identification protocols. In terms of policy making, a focal point has generally been results in competition, as funding dollars allocated to athletes can be justified based on observable, measurable criteria. The inclusion of psychological variables into AC funding frameworks could therefore present challenges, as policy makers would be required to publish standards for athlete psychological variables, just as they do with performance measures. As I have previously discussed, psychological factors do have a presence in TI literature, and have been found to strongly correlate to athletic performance.

In sum, the AC policy documents I made subject to analysis fall short in incorporateing the two key TI constructs found in the literature into their athlete

funding procedures. Research mentioning physical/morphological athlete characteristics form the basis for a large proportion of talent identification studies, yet it has not a single mention in the AAP policy documents. Further, despite their prevalence in the sport science literature, psychological talent correlates are not mentioned in the documents, and are probably not considered in athlete targeting or funding structures. Strictly based on the available documents, it is impossible to say that AC completely neglects sport science literature in this way, following carding guidelines that are unscientific and purely results-based. Raw data in the form of performance marks, and age-related performances are not present in TI literature, yet are two of the key measures of talent and funding worthiness. To explore this issue further, it might be wise to conduct qualitative interviews with current and former AC staff, particularly those involved in policy writing and athlete selection. The following section will discuss the codes I derived from the documents, their presence in the documents, relationship to TI literature, and significance.

AC Policy vs. Talent Identification

In chapter five, I displayed a table of results wherein I applied codes I drew from AAP policy to athletes carded during the document years under examination. Here, I explained and justified a rationale for the application of each code to the athletes, which included explanations for why I was unable to include certain codes as part of the table. In a similar fashion, this section will exclude codes that cannot be applied to TI literature, in addition to describing the

significance of the codes as they were identified in the documents, and the relationship of each to the existing body of talent identification literature.

The identification of each code in the documents, as I have come to realize, is key in forming a complete picture of the ways in which athletes are targeted, and worthy of funding consideration. I feel I can ascribe meaning to these practices by addressing the question of whether AC engages in a scientific and holistic approach to athlete funding, based upon the extant literature available. Moreover, attending to this question could lay the groundwork for potential policy reform, or at the very least, a critical appraisal of the strength of current carding practices. The following sub-sections list all the codes I drew from the documents, with the final sub-section listing codes that I was unable to relate to TI literature for reasons I will describe thereafter.

Achievement of Performance Standard (ST). With both a high frequency of appearance in the documents (20 total times coded), and its seemingly vital importance in athlete funding, the Achievement of Performance Standards appears to be a crucial criterion AC uses to identify and fund talent. An important consideration here is the 'Prioritized Ranking System' I have mentioned a number of times in this study, a rating scale that assesses athletes across a variety of measures and awards points toward carding. With AC granting A, B, C, and D performance standards receiving diminishing point totals respectively, there seems to be an emphasis on the best possible performance marks an athlete can achieve. Further, all documents cite the requirement for an athlete to achieve the minimum 'D' standard to even be included in the carding

pool. In short, it is apparent that AC strongly subscribes to the notion that an athlete is not worthy of funding unless they meet a measurable, precise performance standard.

The relationship of ST to the talent identification literature is best described as complex. Though it does exist to some degree as a measure of athletic talent, I was scarcely able to find relevant literature that cited performance marks as a key identifier of talented athletes. This might be due to the intuitive nature of performance standards as being an effective relative measure of an athlete's ability. I would argue that the code ST does not necessarily represent a TI correlate, but rather the maximum capability of an athlete in the present. Essentially, I feel performance standards are intuitive when it comes to identifying athletic talent, as one can simply compare one individual's performance relative to what is considered 'talented' or 'elite' in the present. This might be the reason for the dearth of academic research relating the achievement of performance standards to talent identification. That said, Green and Houlihan (2008) as cited in chapter two, indicated the post-communist German sporting system to rely heavily on performance marks in competition as the measure of athletic talent, often at the expense of talent appraisals of coaches and other evaluators in the sport system. This notion is consistent with a prominent theme in the sport science literature on TI, that being the idea that in practice, talent identification relies heavily on observable, measurable characteristics of the athlete.

Age-Related Performances (AG) and Top Performer Potential (PP). Since both AG and PP were found throughout the documents, and reflect the same general TI theory, it follows that they should be discussed in the same section. After coding AG in the documents 14 times, and PP 19 times, it became clear to me that AC considers the 'results-based potential' of an athlete to be a clear indicator of funding viability. Chiefly, this idea is conveyed through word usages in the documents that come in the form of "…potential to progress…" or "…"…progressing towards…". Further, AC demonstrates its adherence to this principle in the 'Prioritized Ranking System' I have mentioned throughout this study. As I have previously revealed, funding-related performance standards are more lenient for younger athletes in these tables, becoming increasingly challenging as athletes age and reach full maturity status. Certainly, as research suggests, athletes' maturity status and chronological age do not necessarily coincide with one another (Mohammed et al., 2009), however, AC might not consider it realistic or feasible to assess the physiological maturity of athletes. This type of analysis might be time consuming, requiring multiple assessment tools that could include endocrine profiling. Therefore, a prudent means for AC to assess the maturity status of athletes is by looking at their ages.

The codes AG and PP are well represented in the TI literature. This may be because it is in the absolute best interest of sporting organizations like AC to target young athletes who demonstrate the ability to, in the future, produce results worthy of attention or perhaps team selection. To this end, the TI literature suggests that athletes are often selected based on relative maturity status, most

likely due to the fact that young athletes who have developed early are bigger and stronger than their peers (Davids & Baker, 2007). Such athletes are then identified as future elite performers, and consequently, are generally favored in team selection procedures and for high performance training camps. As such, it is a distinct possibility that AC overlooks gifted individuals who have yet to reach a developmental maturity status equal to their peers. Such athletes could then remain unheralded in their early years, and eventually move on to other sporting disciplines or careers. As a mindful observer, I am unable to stake a claim that AC is aware of this research and has shaped their policies accordingly, however, it is clear that they incorporate age-related performance progression, and the potential for 'eliteness' into their policies. The effectiveness of their practices in this regard remains in question.

Training Environment. As a coding category that I identified most in the 2011-12 policy document, the training environment of an athlete seems to be an important contributor to AC's carding criteria for their track and field competitors. Included in this category were Training and Competition Planning (TP), and Training Center (TC), indicating an athlete's presence at a sanctioned National Training Center (NTC) in Canada. For the sake of expediency, I will discuss TP in relation to the role of the coach in the next section (since the documents state the primary coach must produce an athlete's training plan), and focus on the 'Training Center' criterion in the 2011-12 document.

Training Centers is a code that I identified nine times in the documents (and was also particularly salient in the 2011-12 High Performance document),

that seems to be influential to an athlete's carding potential. Most notably, athletes training environments make up a large proportion of 'Prioritized Ranking System' points in the 2011-12 document, accounting for a possible 40 of 110 maximum points toward carding. Interestingly, a failure to comply with this criteria means an athlete is only granted a maximum of 20 points in the 'Training Environment' category, which could be of great significance should he/she be on the cusp of receiving a card for the upcoming season. Additionally, TC is listed under the sub-heading "Requirements to Remain Carded" and in repetition under the banner "Important Notice", both of which are cited under the main heading "The Carding Process". Generally, this particular policy year places a high emphasis on athletes' presence at a sanctioned training center, suggesting a shift in values in subsequent document years wherein there was scarce coding of TC. I will discuss this concept in greater detail in the section that describes the differences between policy years.

With respect to the talent identification literature, training centers and athlete facilities are seldom mentioned. Generally, publications that cite training environment and central training bases as integral to sporting success do so in the context of talent development and the nurturance of already skilled individuals. The key factor here seems to be the effective and just allocation of resources. Rightfully, organizations like AC that have limited means in the form of finances, human resources, and facilities must first determine if an athlete is worth their investment before allowing them access to their training environments. The position I have taken here is that athletes who are granted access to national

training centers have generally already been assessed according to AC's athlete targeting measures. Athletes' presence at a sanctioned training center is simply a function of their well-established worthiness of development and funding, so by-in-large, the TC code I identified in the 2011-12 document might represent a degree of false presumption of what constitutes funding worthiness. Perhaps, AC adopted the same rationale, as they removed the training center requirement from subsequent documents.

An alternative explanation for the diminished role of an athlete's training environment might be Olympic cycles. As Olympic years place increased pressure on athletes to perform, so too are organizations like AC expected to produce exceptional results prior to, and during the Games. Perhaps, as a function of greater funding dollars available in Olympic years, or the expectation that athletes will perform optimally training at NTCs, training centers emphasis was most dominant in the 2011-12 document leading up to the Olympics. Alternatively, athletes' presence at NTCs means AC assumes a more involved, informed role in their training regimens, and the ability to the control training environment leading up to important competitions. In this way, sub-optimal team performances can be explained easier, as athletes are training in a controlled environment.

Coaching. As coding category, I identified the importance of a coach in some capacity as a major theme throughout the documents. Evident in each policy year, coaching was stressed most in the 2012-13 and 2013-14 AAP Policy documents, likely due to AC's value shift in carding criteria, one which I will

discuss in the next section of this chapter. In analyzing the documents, I delineated coaching into two basic codes: I assigned Coaching Involvement (CI) in instances where the documents stressed the role of the coach in some capacity as crucial to an athlete's carding viability. Though I did not find CI to be directly impactful in the athlete carding process, its presence in the documents serves to intimate the requirement for coaches to be major role-players in the system. Generally this means coaches advocating for their athletes, making carding recommendations, and authoring written athlete agreements in the form of training and competition plans (TP). As I stated earlier, I included TP in this section because the documents explicitly state that training and competition plans must come from an athlete's primary coach, and thus, one could argue that this code is, in practice, a bi-product of the codes CI and CS. Nevertheless, though I generally did not find the coding of CI to be directly associated with carding criteria, the presence of TP in the documents does occur in areas that describe optimal conditions for carding. In particular, the 2012-13 and 2013-14 documents both clearly note the requirement for an athlete to "…submit a…Training and Competition Plan before any funding will be released…" Therefore, an athlete cannot be considered as eligible for carding without the submission of a detailed plan for the upcoming season.

Coaching Success (CS) was a code I ascribed to text that emphasized the importance of a reputable coach. Generally, such statements included or were accompanied by the requirement of a coaching credential, as is evident in the phrasing "…by far the most important factor influencing the quality of daily

training environments is proven coach performances". This statement is present in both the 2012-13 and 2013-14 policy documents, and highlights the emphasis AC places on effective coaching for those policy years. In examining the frequency of, and general location of this code in the documents, it seems CS was instituted as an important carding requirement beginning in 2012-13, in lieu of Training Center (TC) in the 'Prioritized Ranking System'. Further, without the aid of a proven, successful coach, an athlete should not be granted carding should AC practice their own carding mandates. I will address the issue of whether AC follows their own guidelines later in this chapter.

Certainly, both coaching presence and strength are well-represented in the TI literature, so in this way, AC certainly has an empirical basis for their policies. For example, Bloom (1985) found effective coaching to be a crucial component to the development of talented young athletes, with its absence often resulting in talent being rendered untapped. Perhaps this is due to the heightened ability of a knowledgeable coach to recognize potential in young athletes, or the simple practice effect of a coach seeing event-specific talent in repetition over time. Further, TI and effective coaching in the Federal Republic of Germany were described by Green and Houlihan (2008), lending support to the notion that a coach's 'expert eye' can often identify subtle and intangible qualities in athletes.

When considering the presence of a proven coach and talent identification, it is important to consider the likelihood of each preceding the other. Would it be more likely that a previously identified athlete be assigned to an elite coach, or for that coach to stumble upon a diamond in the rough? I submit that, in general, the

talented individual precedes the elite coach. As athletes begin to develop elite qualities they should consider (or are directed at) aligning themselves with coaches who can further sharpen their skills. Generally, elite coaches work with athletes who have developed beyond the grassroots level, whereas individuals who have yet to be targeted as talented would not seek the attention (nor be granted the attention) of a high-level coach. Seemingly, the role of the coach as it pertains to talent identification resides in the 'expert-eye' position of knowledge, whereas in AC policy, the coach acts as a groomer of already established talent. Therefore, I pose the question of whether the inclusion or presence of a proven coach is a necessary ingredient in talent identification and funding, or a simple consequence of talent?

One instance where a proven and effective coach might be a necessary ingredient is in the 'diamond in the rough' scenario I posed earlier. I submit that a coach who has had longstanding experience in his or her sporting careers, and demonstrated his or her ability to produce elite athletes, would be a keen observer of athletic potential. Assumingly, this 'elite' coach, having habitually encountered skilled athletes in the past, should outperform a coach with lesser credentials in terms of the ability to appraise talent. Therefore, assigning an elite coach to both experienced athletes and grassroots talent assessment could be advantageous. Further research in this area might be beneficial.

Codes Not Applied to the Literature.

The preceding codes I identified in the documents were those that I was able to soundly discuss in relation to the existing body of literature in talent

identification. I was able to do so because each code carries a degree of relevance in relation to the essence of TI, that being detecting athletes on the basis of traits or states that are shown to predict performance in sport. With respect to the policy documents, not all of the codes I derived from them could be applied to the extant literature, on the simple basis that a thorough description and comparison to TI science would serve no purpose, and not bring to light any new revelations. I will clarify this statement in the following sections.

Carding Limitations. As I discussed in chapter four, the 'Carding Limitations' category I identified in the documents includes two codes: 'General Limitations' (L) was a code I assigned with high frequency in the documents, and with increasing frequency according to how recent the document was. As I mentioned in chapter four, more numerous carding constraints appeared in the 2012-13 and 2013-14 policy documents in the form of subtle wording changes, the inclusion or exclusion of words, or added criteria that imposed further restrictions on athletes. Why does each subsequent policy document carry greater restrictions that seem to limit athletes' ability to receive funding? Through careful consideration of the information available, I have taken the position that since the 2011-12 document (the first document of the three) was the last AAP policy released before the 2012 London Olympics, it was drafted by policy makers with the knowledge that Olympic years often provide greater funding opportunities for athletes, and perhaps more funds trickling down from Sport Canada or programs like Own the Podium (OTP). Another possibility is that AC operates in a slightly different fashion during Olympic years, catering to a more liberal athlete selection

environment that sees everyone bring their best shape and training habits to the season with hopes of fulfilling their Olympic dreams.

Of course, these are educated guesses, the basis of which I formed from going over the extra 'High Performance' document that accompanies only the 2011-12 policy. Here, the 'High Performance Olympic Program' is described in detail, listing the select athletes that were made part of the program, as well as the extended benefits afforded to each as a result of being chosen. Neither the 2012-13, nor the 2013-14 documents make any mention of special high performance programming, an impending Olympic Games, or extra resources dedicated to athletes in the upper echelon. In sum, general carding limitations in the form of increasing restrictions cannot be compared to the TI literature. They run in contrast to the very definition of talent identification, recognizing states or traits in athletes that diminish their potential value as team members. I will discuss these differences further in the final section of this chapter.

Injuries. This code, which I denoted as J, was the second code in this category that could not be discussed directly in relation to TI literature. Widespread in the documents, I coded J in situations where circumstances surrounding athletes' injuries served to limit their funding worthiness. With this in mind, it was difficult to apply this code to the talent identification literature because there is, fittingly, no specific mention of injuries in relation to targeting athlete talent. In fact, injuries inhibit peak athletic performance, thereby running in counter to TI as a construct. However, the TI literature does suggest some relationship between biomechanical and anthropometric variables and the

realization of talent. I have included the term 'realization' of talent as pertaining to the discussion of injuries because of the very idea that they inhibit peak performance, limiting an individual's capacity to realize his or her maximal potential. A study completed by Hattingh (2003) supported this idea, finding that youth rugby players exhibiting pelvic weakness, poor core stability, and muscular asymmetry become more injury prone, resulting in reduced performance in competition. AC policy outlines injury criteria that limit athletes' entrance into the system, and maintenance of carding, once again running in counter to TI. Though the code carries relevance in terms of athlete selection and funding consideration, it is difficult to discuss injuries alongside TI without first giving careful consideration to the relationship between the two.

Further Codes Not Applied. The remaining three codes I identified in the documents were all significant when it came to athlete carding, but cannot be part of the talent identification discussion. 'International Success' (IN), as I discussed in chapter four, was a code I assigned to situations where document text mentioned athletes either already achieving success on the international stage, or demonstrating the potential to do so. To me, this code represents athletes who are well beyond being identified as talented, approaching the elite level of competition. Further, 'Established Card' (E) is a code that can be characterized in the same way. I identified E in passages of text that placed athletes in the carding pool should they already have a card, meaning these athletes have already been assessed by AC's athlete targeting criteria and were past that stage. Though it is certainly a meaningful criterion in the documents, E could not reasonably appear

in talent identification literature. Intuitively, the code 'High Performance' (HP) can be included in this conversation, as I made note of it when the documents mentioned an athlete's purported ability to finish in the top-eight at a major senior-level competition like the World Championships or Olympic Games. Certainly, an athlete at this stage has long been known to be talented, and worthy of funding. Generally, I assigned these codes to passages of text that pertained to talent in athletes, only they represented already established talent rather than criteria by which athletes were identified as talented. Certainly, the TI literature could, for example, describe how an athlete who has had international success could fit into TI models. But it would be redundant, as the very idea of the code IN implies athletic talent.

The following section will provide a detailed analysis of chapter five. I will explore the implications of all the codes I derived from the documents with respect to the athletes carded during the first two AAP policy years. It is my aim to give depth and dimension to the question of whether AC adheres to their own policies for carding athletes.

Analysis of Carded Athletes

An important aspect of this study was the analysis of AC's policy in practice, that is, how closely AC abided by their policy. Hypothetically speaking, if AC were to follow their carding policies as they are written, they could stake a claim that if nothing else, their funding procedures are consistent, and represent a degree of fairness to athletes. To qualify this I feel a relevant issue in this discussion is the bureaucracy, and accountability framework that exists between

Sport Canada and AC. As I previously outlined, the documents describe the multiple roles of Sport Canada, acting as an allocator of funds to AC, and granting final approval of carding recommendations. Further, if Sport Canada were to identify a failure in AC meeting their own guidelines could come with consequences in the form of funding cuts, firings, or the assumption of greater control over AC's activities. Indeed, potential consequences could arise from including and excluding athletes on the basis of non-policy-related criteria. An individual excluded on this basis would certainly have grounds to appeal, as funding policy exists for the very reason of providing predictable and measurable standards to card athletes. The following section will give depth to my findings in chapter five.

Carded Athletes and Carding Criteria

In general, the results in tables 5.1, 5.2, and 5.3 indicate that AC did abide by their published AAP policies for the years 2011-12, 2012-13, and 2013-14. As I indicated in chapter five, I found the latter two documents to have mostly subtle and inconsequential differences between them, and therefore, they were coded in an almost identical fashion. This allowed me to select athletes included in only the 2011-12 and 2012-13 documents, a comparably larger sample than athletes who overlap in all three policy years.

High Adherence Codes. Looking at the codes I applied to the 38 athlete sample, Coaching Success (CS), Age-Related Performances (AG), Established Card (E), Personal Best (PB), and Performance Standard (ST) each carried a high rate of observance as it pertains to AC following their own guidelines. Worthy of

note here is the idea that an athlete already being a part of the carding roster (coded as E) may not directly affect carding decisions (as carding can be granted and revoked), however, the document does state this as a carding criterion. Additionally, applying the 'Coaching Success' code to the athlete sample required me to think critically, and even research the credentials of a number of coaches. As I deemed this code to be integral in the carding process, I felt it prudent to exercise caution in grouping coaches according to how a successful coach is described in the documents.

To this end, the sample of athletes, in general, had coaches with some proven international competition experience. A number of athletes in the sample were found to work with coaches without the minimum credentials listed in the documents, which I was able to verify through internet research, particularly an AC site wide search. Those that partially met the criteria were found to have a coach with limited experience, or one who had yet to send an athlete to a World Championships or Olympic Games. As is evident in the value shift in the 2012-13 document and onward, the importance of a proven and effective coach probably did not have as significant an impact on carding decisions prior to this carding cycle, thereby providing possible insight into the seven athletes who failed to adhere to the CS code. Correspondingly, coaching success became a key factor in the 'Prioritized Ranking System' as of 2012-13, assigning greater point totals and emphasizing the crucial role of an athlete's primary coach. The 2011-12 document cites an athlete's training center in the same section of this appendix.

Generally, as a widely underscored carding criterion, CS adherence is characteristic of the majority of the athlete sample.

Following suit, Age-Related Performances (AG) was a code I identified in the documents that was met by the majority of carded athletes. As stated both in the 'Prioritized Ranking System', and throughout the document text, Age-Related Performances seem to be a focal point of the AC documents. The desire of AC to nurture young talent and enrich their performance environments through the granting of carding funds was palpable throughout the documents, and correspondingly, coincided well with the athletes in chapter five. In the sample of 38 athletes, not one failed to meet the minimum age-related performance criteria for carding. This might suggest AC does not make exceptions for any young athlete, regardless of exceptional qualities or perceived performance potential. Further, I feel this provides supporting evidence for AC's dedication to measurable performance standards.

To this end, Performance Standards (ST), one of the principle themes in the documents, were achieved by all but one athlete in the sample. This reinforces my observation of AC's dedication to baseline performance marks as an assessment tool toward funding athletes. The inclusion of such standards in the documents allows AC to limit the number of cards they grant, as well as provide athletes vying for carding with performance benchmarks. The lone athlete who failed to meet her performance mark achieved a result and personal best that was short of the minimum standard, and by AC's criteria, should not have received funding. In researching this athlete further, I discovered she is affiliated with a

national event group coach at a National Training Center, and could have been targeted as a raw talent with elite potential (PP). Lending further support to this explanation is the young age of this individual. In the years of the carding cycles I studied, the athlete was between the ages of 18-20, with an abundance of time to improve to an elite level. This might account for AC's deviation from their policy.

Finally, Personal Best (PB), also noted in the 'Prioritized Ranking System', is a code characteristic of most athletes in the sample. Due to its bearing on point totals in the ranking system, this makes intuitive sense as the achievement of a personal best during the carding years would result in a higher probability of amassing enough points to attain or retain carding status. It seems AC places a great deal of value on personal bests, maybe because they are indicative of an athlete continuing to improve, pushing performance boundaries. In tandem with the achievement of the minimum performance standards, personal bests in athletes might be seen as a sound investment for AC, as there is an implied degree of work ethic that accompanies reaching new levels of performance.

Low Adherence Codes. The remaining codes I applied to athletes carded in the 2011-12, and 2012-13 documents had a relatively low rate of observance. The codes Training Center (TC), High Performance (HP) and Potential to Progress to Elite Status (PP) were far less common to the athlete sample than the preceding codes I described, but do not necessarily constitute fundamental flaws in athlete selection by AC. With regard to HP and PP, a more detailed explanation

is required to provide insight into this notion. I will provide a rationale for this premise in the following section.

As it was a focal point only in the 2011-12 carding document, I found an athlete's presence at a Training Center (TC) to be characteristic of roughly half the athletes in the sample. Perhaps, this could be attributed to the decreased emphasis of NTCs in the two subsequent documents, however, it was impossible to determine where (and with whom) an athlete trained during the 2011-12 season. To qualify this, a decreased emphasis on NTCs might give athletes the perception of greater freedom in choosing a coach and/or training environment, and thus, they might be inclined to train where they wish. Therefore, I was forced to work under the assumption that athletes' current coaches and training locales were relatively static from 2011-12 onward. Regardless, it is apparent that though AC placed a great deal of emphasis on training centers in the past, it was never a requirement for carded athletes to make them their training bases. For example, the sprinter Jared Connaughton, a former NCAA athlete at the University of Texas, Arlington, kept his training base in the southern United States after college (he graduated around 2008) and has remained there ever since. Though it seems to be AC's desire to oversee the training of their athletes at NTCs, it is certainly not a requirement.

Further, High Performance (HP) and Potential to Progress to Elite Status (PP) can be applied similarly to the athlete sample. Athletes meeting AC's minimum performance marks and overall carding standards does not necessitate they fulfill the document's definitions of high performance or 'elite'. These codes

are present in the documents as overall program mandates, that is, toward the

assistance and development of athletes with the goal of producing world-class

performances on the international stage. In particular, I identified these codes in

the 2011-12 document, signaling AC's commitment to elite performances leading

up to an Olympic year. Though I identified them in the more recent documents,

they were greater in numbers and quality of description in the lead up to the 2012

Olympics. It makes intuitive sense that these codes had lower adherence rates

than the others, as not all carded athletes could possibly fit the definition of HP (a

top-12 world ranking), or be described as having the potential to achieve a top-16

world ranking and/or a high finish at a major international competition.

Undoubtedly, one could argue that such athletes deserve additional attention in

the form of funding and training opportunities, as AC certainly places great

emphasis on international success, especially at the Olympics. High performance

is mentioned on numerous occasions in the documents, and represents one of the

fundamental differences between the 2011-12 document, and the 2012-13 and

2013-14 documents. The following section will explore and provide possible

explanations for these differences.

Analysis of Document Differences

It cannot be denied that all three years of policy documents have a great

deal in common with one another, and in fact, are more similar than they are

different. These similarities come in the form of policy initiatives, carding criteria

sets, performance standards, and aspects of the aforementioned 'Prioritized

Ranking System'. In chapter four, I listed and gave a brief description of the

primary differences I identified in the documents. I termed these differences Specificity and Carding Constraints, Olympic Cycles, and Training Environment and Coaching. Throughout this study, I have routinely broached these topics, alluding to and giving brief descriptions of the document differences. This section's focus will be to provide insight into the reasons for, and potential consequences of these differences.

Specificity, Carding Constraints, and the Olympics

From one document to the next, the 2011-12, 2012-13 and 2013-14 documents carry with them increasing carding constraints, and specificity of language that is limiting to athletes' carding viability. As I previously described, such restrictions come in the form of more numerous criteria required of athletes, subtle wording additions, and a narrower selection range of athletes. As these changes came to my attention, my natural inclination was to ask myself why they occurred, and what might come as a result of them. First, there exists the possibility that more stringent carding policies may have come as a result of the 2012-13 document falling after an Olympic year, when there is probably less attention paid to high performance, and potentially fewer funding dollars available. Alternatively, the Olympic year may have brought about a larger talent pool of athletes vying for cards, thus creating a higher demand for funds that are already scarce. This may have forced AC to add additional or more stringent criteria, imposing further limits to athlete selection. The 2011-12 document certainly has more leniency in terms of carding restrictions, and is far less specific in general, which in my view creates more room for interpretation in assessing an

athlete's funding worthiness. Imposing these 'post-Olympic' restrictions could have damaging consequences in the form of a diminished talent pool of athletes, which could come about from the restrictions themselves, or the perception that becoming a full-time athlete would be far too difficult given more limiting criteria. Evidence of this 'Olympic explanation' resides in the 2011-12 High Performance document, where 'Team 12' athletes are named, and granted additional training and competition benefits. This type of document is absent from all appendices in the two subsequent documents.

Another explanation for the increased specificity and constraints in carding policy from year to year could be due to greater numbers of quality athletes in the Canadian track and field system. This is not to say that, during the years I have examined there has been an obvious increase in this respect, but that it might explain greater constraints imposed on carding. More numerous and talented athletes, and a lack of increase in funding reserves have the potential to overwhelm AC's system, equating to a tightening of policy. Not only could this act as a potential deterrent to carding applicants, but limit entrance into the system for those who applied. Generally, the evidence does suggest a discrete change in policy from 2011-12 to 2012-13 in the form of more limiting criteria, and any explanations I have offered should be considered speculative, and based on the available evidence.

Training Environment and Coaching

As I have discussed throughout this study, there seems to have been a value shift pertaining to what is favored in an athlete's training environment.

These changes appeared in the documents in a variety of ways, and are especially evident in the 'Prioritized Ranking System' of points used to assess athletes' carding worthiness. Here, the training center criterion included in the 2011-12 document is replaced in each of the two subsequent documents with a points ranking system that assesses the strength of an athlete's coach. This is the single factor included in the training environment component for the 2012-13 and 2013-14 documents. Additional instances of this substitution appear elsewhere in the documents, outlining the importance of a knowledgeable and experienced coach in place of an athlete's presence at an NTC.

Admittedly, I experienced some difficulty attempting to explain this shift in policy. Perhaps AC found no relationship between performance and an athlete's presence at an NTC, and decided that imposing this requirement on athletes made little sense. I can, indeed, envision scenarios where this might be an appropriate course of action. For example, training in warm weather environments is said to benefit track athletes, as the quality and volume of workouts can be stronger when compared to cooler environments. Quite possibly, a number of athletes included in chapter five hold the same belief, training in warmer locales like Texas, Oklahoma, and Florida year-round.

A second possibility I considered is centered on the role of the coach in an athlete's daily training environment. Both the 2012-13 and 2013-14 policy documents stress the importance of an effective coach, a criterion that was barely mentioned in the 2011-12 document. As I mentioned earlier in this chapter, research suggests the role of the coach to be crucial in the development of young

athletes. Perhaps, AC became increasingly privy to academic works in the field of coaching theory, and found that coaching carries greater importance than the physical environment in which an athlete trains. Further, athletes who trained outside an AC training environment, yet still succeeded, provide a counterexample to the value placed on NTCs in the 2011-12 document. Athletes in the chapter five sample like Jared Connaughton and Nathan Brannen have both flourished while training abroad, each under a coach with proven international success. Perhaps it is this kind of counter-evidence that encouraged a policy shift in AC, or maybe it was the simple product of a de-emphasis on NTCs due to funding cuts. These questions could be answered through qualitative interviews in a further study.

Conclusion

To conclude, I will say that the nature of AC's carding protocols can be characterized as empirically-based, at least to a degree. Carding principles like age-related performances, general performance marks, and the importance of a skilled coach are all present in the literature in some capacity, though they certainly do not make up a great proportion of TI research. Generally, TI literature has been bound in talent correlates that are focused on streamlining the process of talent identification. The goal here has been targeting athletes based on personal characteristics that have been found to bear a strong relationship to athletic talent. These athlete qualities are ever present in the literature, focusing on athletes' physical and psychological states.

Perhaps, TI research resides in these athlete characteristics because of their long-term predictive value. Measurable performance standards, and age-related performances are overt gauges of talent, therefore, sporting organizations like AC could extrapolate on them and predict future performances for developing individuals. Conversely, athletes' physical and psychological traits are probably worthy of interest because every athlete has a unique combination of strengths and weaknesses in these domains, relative to his or her sport. Therefore, research on these athlete qualities could forecast talent from a young age, when age and performance marks are less predictive of future 'eliteness'.

Based on the codes I applied to the athlete sample, my position holds true: performance marks in competition, and those relative to an athlete's age, are some of the primary means by which AC targets and funds athletes. It is these measurable performances that seem to allow an athlete entry into the system, rather than less measurable, personal qualities like physical stature or anxiety management. As I alluded to earlier, I feel this makes intuitive sense as assessing athletes within, and outside the carding system along morphological and psychological dimensions would be a monumental task, and require additional human and financial resources. Perhaps then, AC's lack of compliance with the primary TI tenets in the literature is due to the convenient and economical nature of measurable results. In assessing athletes on their performance in competition, AC exercises a safe and reliable practice, avoiding ancillary costs that might be associated with psychological or physical testing batteries. Canavan (2000) provides supporting evidence of this idea from a team sports context, finding that

the majority of player recruitment done by college football coaches occurs through on-field player analysis during games, and has little to do with abilities assessments in controlled settings. The exception to this rule seems to be what is known as the football combine, a battery of physical tests that rate players by speed, strength, and agility. The 'Combine' exists predominantly for professional football scouting.

Finally, this chapter offered a number of explanations for policy changes between documents, particularly between the 2011-12 and 2012-13 policies. I cited a number of possible explanations for this, including stronger athlete talent pools, and the Olympics being a focal point of policy makers. Leaving out specifics, one could argue that these types of policies tend to change naturally over time, incorporating new research, methods, and historical precedent into carding schemes. Perhaps then, these changes are not a product of one single value shift, but are a result of numerous factors that necessitate a change in accepted practice. In my concluding chapter I will discuss the greater implications of these changes, talent identification, and funding policy.

Chapter 7: Implications and Significance of Findings

Introduction

During my undertaking of this research, I have come to realize that talent identification is a multifaceted, complex process that aims to target athletic potential with the greatest of efficiency. Additionally, I have found that the theoretical underpinnings of TI, as they exist in the sport science literature, are not fully represented in the practical application of talent identification in the form of athlete funding practices. In chapter six, I gave my own detailed appraisals of why I believe this is the case, based on my findings. With explanations ranging from a purposeful lack of adherence by Athletics Canada (AC) to this body of literature, to the overly cumbersome nature of applying a number of TI principles to real-world settings, the sum of these inquiries amounts to a discernable disjoint between TI literature and TI practice. This is not to say that AC's carding protocols have no empirical basis, but simply, their AAP policies fail to incorporate key TI theories toward funding. Further, in my assessment of carded athletes for the documents I analyzed, it seems that generally, AC abides by their own carding policies. Notably, codes I identified in the documents pertaining to performance related measures had strong athlete adherence, suggesting AC makes few or no exceptions when it comes to results-based criteria.

Thus far, I have reviewed the extant TI literature, described the research methods I employed, detailed the results of my study, and discussed my findings. Though I cannot stake the claim that what I found can provide definitive answers pertaining to the empirical nature of AC's carding system, I feel my findings are

compelling, and significant enough to arouse debate in the areas of carding policy and athlete targeting. This chapter will outline the greater significance and implications of my study, and potential future directions of academic research and policy reform with respect to talent identification. Here, my aim is to communicate the real-world, practical applications of my findings, and a number of theoretical models that could be applied with respect to current research in the field. Further inquiry into TI theory and practice could result in more comprehensive athlete-targeting models, or perhaps act as a catalyst to fundamental changes in NSOs funding procedures.

Implications of this Study

In chapter six, I took aim at giving depth and substance to the research question I posed early in this study, that being the degree to which (or whether or not) the practical application of athlete targeting in Canadian track and field utilizes empirical means in their policies and practice. To accomplish this, I referred back to the talent identification literature, where physical/anthropometric and psychological variables represent the bulk of academic research on TI in sport. Correspondingly, I applied the codes I produced from the AAP policy documents to the breadth of academic TI articles I gathered. This allowed me to determine if these codes were aligned with TI literature, and additionally, gave me insight into codes that could not plausibly be applied to the sport science literature. In tandem, both tasks served to determine AC's tendency to practice science-based policy.

Certainly, one could make the argument that AC funding policy is evidence-based. This does not necessarily mean they uniformly draw their criteria from sport science research, but simply that their methods have a specific rationale, are justifiable, and supported by competition results. Primarily, AC's approach to athlete targeting and funding is focused on a 'here and now' frame of reference. In large part, they fund athletes based on reliable and measurable performance marks, as is indicated in the 'Prioritized Ranking System' I have referenced throughout this study. A general conclusion I came to after reviewing and considering the implications of my findings is that the dominant criteria AC subscribes to are results and performance-based, and have little to do with athletes' potential in the form of physicality or psychological strength.

That said, I feel the AC carding system has the potential to move toward a more informed, empirically-based, and multi-factoral TI model, incorporating both performance-based criteria and sport science literature into its policies. To this end, I propose a hybrid system, combining the predictive component of sport-science research with the current AC policy model. As I alluded to in chapter six, talent identification in AC targets athletes who, for all intents and purposes, are already generating notable performances. Generally, such athletes were touted as having the ability to progress to the elite level when they were young, and were granted access to the carding system based on exceptional results at developmental stages. With this in mind, I have adopted the position that AC engages primarily in 'talent recruiting', and to a lesser degree, talent identification.

I feel that taking into consideration the bulk of my findings, the idea of AC's practice of talent recruiting is key to system reform. Employing a systematic approach focused solely on observing and recruiting athletes is one dimensional in nature, and could be strengthened by talent identification practices aimed at athletes yet to exhibit performances worthy of funding, or attention for that matter. AC's approach largely utilizes talent recruiting methods, rewarding established athletes for performances they have produced as a result of natural talent. Certainly, such a reward system provides incentive for talented individuals to enter the national team system, however, I feel its role as the primary means of talent identification is inadequate.

To supplement this 'here and now' talent recruiting practice, AC could adopt a grassroots talent movement, applying sport science literature to young athletes who have yet to break through internationally, or show direct performance-based predictors of future success in track and field. Largely, the TI literature of sport-science is predictive in nature, attempting to identify physical and psychological dimensions of talent that correlate to sporting success. For me this makes intuitive sense, as there would be a degree of redundancy in conducting TI research looking at competition results of athletes relative to their peers. Quite simply, results are results, and there is little room for interpretation. In fact, results based TI research would not require any planning or experimental design whatsoever, and could be accomplished by looking at athlete rankings and weighing them against carding standards. Nevertheless, incorporating a grassroots talent identification program into existing athlete selection practices could widen

the scope of athletes being targeted, looking at young athletes who have yet to excel at the elite level.

A significant concern in including grassroots talent identification into the AC carding system would be the associated costs of such a program. Additional human and financial resources would be required to assess young athletes by physical and psychological measures, and in the face of already scarce resources, might not be feasible at present. To account for these added program costs, AC would be forced to secure additional funding from Sport Canada, or seek funding in the private sector in the form of corporate sponsorships or donations/endowments. Perhaps, the most necessary requirement if the system were to be revamped is policy reform within Sport Canada, edging toward TI mandates that identify and develop young athletes based on applied sport-science research. Of course, significant changes require compelling evidence that suggests change is needed, and thus, further research to support my findings would be a stronger vehicle for change.

Importantly, based on TI literature and codes I produced from the documents, it seems age-related ability should play a substantial role in talent targeting and recruiting. Conceivably, AC could incorporate their current age-related performance measures with the 'grassroots movement' I alluded to previously, assessing young athletes in the TI domains I detailed in the literature. As part of this process, AC could expand their age-related criteria for athletes, including younger age-groups and corresponding performance benchmarks measuring athletes' worthiness of attention and/or resources. In this way, AC

could actually use current sport science research, and dedicate resources to young individuals who exhibit what they consider favourable traits.

On a related note, AC and organizations of the like are almost uniformly limited by the finite resources granted to them in the form government subsidiaries. Therefore, for change to take place, accepted practices, those with historical precedent, and those seen as normative, must be called into question for change to take place. One cannot discount the notion that results in major competitions reflect the strength of a country's sporting system, which is strongly emphasized in AAP policy. I have taken the position that for AC to maximize their probability of success in this area, their chief concern should be identifying and targeting athletes who possess characteristics that are predictive of international success.

Future Research Directions and Final Thoughts

As I have mentioned throughout this study, AC places a great deal of emphasis on performance marks, results, and ranks in major international competitions. In fact, one could argue that the carding system in place serves as a means to an end for this core value: success on the international stage. Perhaps, little has changed since the German Democratic Republic (GDR) reigned supreme in international sport, stressing the importance of dominating the sporting realm, an assertion of power and superiority to other nations. As mandated in AAP policy, the ultimate goal of providing athletes with funding is success in World Championships or Olympic Games, through producing individuals capable of high finishes in these major competitions. Correspondingly, the second part of my

study looked at the degree to which AC adheres to their own carding criteria, a question I attempted to answer with a sample of all carded athletes measured against codes I derived from the documents. I feel completing this task added another dimension to this research, and could be expanded on to provide further clarity toward fulfilling AC's core value of investing in international success.

An interesting proposition here might be the inclusion of a further 'athlete outcome' study that could provide AC with a degree of insight into their funding endeavors. As it was not a code (or could possibly be a code) in the documents, I feel AC would benefit from looking at the results and placings of athletes in international competitions, and compare them to the codes I have drawn from the documents, or entire carding documents in their entirety. Essentially, athletes' results and ranks in major international competitions could be tracked, recorded, and analyzed over time in an attempt to identify what characteristics in track athletes can be considered optimal, or predictive of success.

Further, these competition results could be considered in tandem with sport-science literature in TI. Athletes who were found to have profound and repeated success internationally could be tested using physical and psychological parameters. In line with the body of talent identification literature, a post-hoc analysis of how international success correlates to athlete characteristics could improve AC's carding situation. For example, AC could look at current athletes in the system who have medalled at major international competitions, and assess their physical and psychological characteristics. Studies such as this could reveal common traits that correlate to elite performances, having the potential to be

incorporated into athlete selection policy. Correspondingly, such a study might allow AC to shape their carding procedures more toward success in international competitions. Engaging in this process might then allow AC to streamline any amendments to talent identification procedures toward athlete characteristics that strongly correlate to success in major championships. As they deem this to be their end game, this is something they should strongly consider.

However, as described by Franke and Berendonk (1997), procedures involving the physical (and psychological) probing of athletes present with significant ethical concerns. A pertinent example of this rests in GDR practices, where athletes' muscle tissue density was tested through biopsies and other invasive procedures. If AC found that a commonality between the majority of medal winners in major championships was an abundance of fast twitch muscle, could they ethically justify taking tissue samples from young athletes? Further, as I outlined earlier, psychological testing comes with major ethical concerns including the health and welfare of the individual being tested, informed consent, and the permission of parents should the individual be under 18. It cannot be argued that evidence-based grassroots athlete targeting could prove beneficial to AC's talent pool, however, humaneness and individual welfare certainly take precedence.

Sport-science literature and funding procedures have, and will continue to, evolve as new research and schools of thought come to the forefront. To this end, it is the responsibility of organizations like AC to be receptive to change within their sporting systems, and at minimum having the same propensity to grow and

prosper that other nations do. Allowing space for new and innovative talent identification practices could allow AC to pioneer ground-breaking and dominant practices in this field, and stay ahead of the curve in the realm of talent targeting, recruiting, and TI. It is through efficient and effective utilization of their scarce resources, and of course their willingness to accept interesting and creative new TI studies (perhaps this one), that this might take place. Personally, the prospect of seeing the endless possibilities and room for growth in this field of research fills me with excitement and curiosity.

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