

**The Attainment and Refinement of Elite-Level Curling Expertise:
Similarities and Differences Among Olympic and World Champions**

by

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Abstract

The purpose of this study was to carefully examine the career histories of four male Olympic and/or World Champion curlers in order to better understand the attainment and refinement of their elite-level curling expertise. A mixed-method design was employed, with the qualitative element core, the quantitative element supplementary, and both elements examined simultaneously (i.e., QUAN + *qual*). This study's qualitative element, which was based on an in-depth interview with each curler, identified 'The Five Components of Curling Expertise' (i.e., technical, tactical, physical, mental, and social). It also identified common themes reflecting how these curlers went about developing each of these components across three distinct career periods.

Beyond these key similarities, this study's qualitative element also identified clear differences in these curlers' journeys to the top of the sport, and in what they did to stay there. These differences were reinforced by its' quantitative element, which showed a considerable range in their absolute and proportional investments in different types of training and competition at all points in their careers. However, it also showed that these curlers' average annual training and competition investments grew steadily as their careers progressed, including after they had achieved elite status. This study helps to advance the existing literature on talent and athlete development, and offers recommendations to those interested in studying and/or supporting the attainment and refinement of elite-level curling expertise.

Preface

This thesis is an original work by Robert Edward Krepps. The research project, of which it is part, received research ethics approval from the University of Alberta Research Ethics Board on May 19, 2015, Project Name: 'The Development of Elite-Level Athletic Expertise in the Sport of Curling' (No. Pro00056287).

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Chapter 1: Introduction

The pursuit of excellence in elite-level sport is of great interest and importance to coaches, administrators, and researchers around the world. However, in order to succeed on the international stage, the athletes they guide and/or study must have the level of expertise that is required to produce world-class performance. According to Ericsson, Krampe, and Tesch-Romer (1993), expert performance in any domain is characterized by the mastery of all available knowledge and skill within that domain. At the same time, these researchers indicate that an even higher level of performance is possible, which they refer to as eminent performance. "The criteria for eminent performance goes beyond expert mastery of available knowledge and skills, and requires an important and eminent contribution to the domain (Ericsson et al., 1993, p. 370).

Along related lines, Gulbin, Croser, Morley, and Weissensteiner (2013) proposed that elite-level athletic performance has three distinct levels: 1) senior elite representation, 2) senior elite success, and 3) sustained success or mastery. According to these researchers, senior elite representation is the minimum standard to judge an athlete as elite, and involves regular participation in senior international or major professional competitions. Senior elite success represents a more stable elite standard in that it requires podium finishes on the international stage, or comparable professional performances. Finally, sustained success or mastery is analogous to the eminent performance level described by Ericsson et al. (1993), and requires multiple international or professional titles over a period of eight or more years.

Gulbin and colleagues also pointed out that “our understanding of elite performers needs to move beyond generalizations of the characteristics of experts at the time of competition, and include the contribution and interrelationships of previous developmental experiences and attributes” (Gulbin et al., 2013; 1,327). Further to this perspective, *the purpose of the current study was to carefully examine the career histories of four still active male curling champions in order to better understand the attainment and refinement of their elite-level expertise.* The curlers who took part in this study had all won multiple major championships over a sustained period, including at least gold medal for Canada at an Olympic Winter Games or World Championship.

With this in mind, it is noteworthy that Canada is the dominant country in men’s curling, and has been for many years. As evidence of this point, since the 1998 Winter Olympic Games, when curling made its modern day debut as an official sport, Canada has never failed to reach the medal podium. In fact, after taking home silver in their first two attempts (i.e., 1998 and 2002), Canadian men’s teams have won gold three consecutive gold medals (i.e., 2006, 2010, and 2014). It is also noteworthy that in the 10 World Championships that were held between 2006 and 2015 (i.e., when data collection ended in this study), the Canadian men have won a total of nine medals, with six being gold.

What makes these accomplishments even more impressive is the fact that eight different teams have represented Canada in the 13 major international events (i.e., Olympics or World Championships) that occurred between 2006 and 2015. This diversity of representation is largely the product of the depth of Canadian men’s curling, which is beyond compare in the curling world. This depth is readily apparent in Table 1.1, which compares the proportion of Canadian vs. International teams in the top-10 on the year-end

World Curling Tour (WCT) Money List over a 10-year span. As you can see from this table, Canadian teams have dominated the WCT Money List in recent years, accumulating more than 10 times the top-10 placings as their International counterparts.

Table 1.1

Canadian vs. International Teams in the Top-10 on the Year-End World Curling Tour Money List

Season	Number of Canadian Teams	Number of International Teams
2014-15	9	1
2013-14	7	3
2012-13	9	1
2011-12	8	2
2010-11	9	1
2009-10	9	1
2008-09	10	0
2007-08	10	0
2006-07	10	0
2005-06	10	0
Total	91	9

Note. This information was drawn from the Money List section of the World Curling Tour website. Retrieved from <http://www.worldcurl.com>.

Beyond the obvious depth of Canadian men's curling, another factor that has contributed to the country's diversity of team representation is the means by which its international representatives are determined. Unlike most other Canadian team sports, which tend to assemble their international teams by selecting and combining their most expert athletes, Curling Canada has always chosen to send the winners of certain pre-determined domestic events. For example, Canada's representatives to the World Men's Championship have always been the annual winners of the Canadian Men's Championship, which since its inception in 1927 has been known as the Brier. Canada's Olympic

representatives are also decided in competition, but in that case the competition is the Canadian Curling Trials, or as it is most often called, the Olympic Trials.

With this situation in mind, it is easy to see why the Olympic Trials and the Brier are widely seen as being among the most important events in Canadian men's curling. With this said, they are not the only events that are considered to be major championships. In fact, beyond the Olympics and World Championship themselves, six other events are generally accorded this status. These events include the Canada Cup, the four Grand Slams (i.e., Masters, National, Canadian Open, and Players' Championship), and each curler's own Provincial Championship.

Winning these major championships is a key focus of elite Canadian men's teams, not only in terms of the competitive distinction that they provide, but from the standpoint of financial gain as well. To this end, it is important to note that these teams are essentially self-formed business entities that have the potential to be quite profitable. In fact, when all sources of revenue are considered (i.e., prize money, corporate sponsorships, government funding, etc.), the top men's teams in the sport are able to generate a profit several hundred thousand dollars on an annual basis. There is therefore a strong incentive for these teams to stay together, at least as long as they are achieving competitive success.

With this said, it is clearly in the best interest of the sport's national governing body, Curling Canada (formerly known as the Canadian Curling Association), to encourage the country's top teams to stay together as well. This helps to explain why the Curling Canada becomes directly involved in funding its top teams, which is something that it does through its National Team Program. This program is currently made up of the top six teams of each gender as determined by the Canadian Team Ranking System (CTRS). The National Team

Program provides significant resources to enhance training and competition opportunities for Canada's elite teams, along with access to an expert group of coaches and consultants (Canadian Curling Association, 2013).

The National Team Program represents Curling Canada's predominant means of influencing the performance of its top teams. To this end, there is an expectation for each team to put in place a sound annual plan that incorporates training, competition, and recovery (Canadian Curling Association, 2013). However, no absolute requirement currently exists that any team follows prescriptive advice, or that it works with specific coaches or consultants. Consequently, elite Canadian teams retain considerable freedom with respect to their ongoing developmental activities.

The same can be said for another group of athletes who are also funded by Curling Canada, in this case through its La Releve Program. This program is aimed at athletes between the ages of 21 and 32, who play on teams that have fallen somewhat short of qualifying for its National Team Program. The purpose of La Releve program is to enhance these athletes' development by giving them access to the same group of expert coaches and consultants that are available to National Team Program athletes (Canadian Curling Association, 2013).

Although this has been accomplished in a various ways over the years, including through large-scale training camps, today's La Releve Program supports two teams of each gender, and does so in a manner that is generally comparable to its National Team Program (Canadian Curling Association, 2013). Consequently, like their more accomplished counterparts, La Releve Program athletes are also able to make most of their own choices with respect to their ongoing developmental activities.

It is noteworthy that until recently Curling Canada has had little to no direct involvement in the development of athletes at the junior level (i.e., under age-21), since this has traditionally been as the responsibility of its provincial/territorial affiliates and their member clubs. In fact, Curling Canada's involvement in junior curling had typically been limited to running the annual Canadian Junior Championships, and to sending team leaders with the winners when they represented Canada at the World Junior Championships.

This situation has changed over the last decade, however, thanks largely to a major initiative within the Canadian sport system that called for all national sport governing bodies to adopt the Long-Term Athlete Development framework, or as it is more commonly known, LTAD. Curling Canada's LTAD (Dagg-Jackson, Balyi, Soligo, & Way, 2008) gave the organization a new impetus to influence curlers at every age and stage of development. This includes a greater involvement in junior curling, where Curling Canada has initiated several talent identification projects in recent years and has influenced development programs in various parts of the country.

Curling Canada's LTAD has also had a major impact on university and college curling, which was previously little more than an afterthought in its overall development system. However, in response to the reality that many promising young curlers were stepping away from the game to pursue a post-secondary education, Curling Canada has made a significant investment in this area in recent years. More specifically, it has established credible national championships in both settings, and has become directly involved in running these championships.

However, as worthwhile as these types of LTAD related initiatives may prove to be, there has not been sufficient time for them to have much of a direct impact on the athletes

who are now representing Canada in major international competitions, or who are part of Curling Canada's National Team Program. In fact, it has only been in the last few seasons where athletes touched by these initiatives have begun to enter its La Releve Program. It is therefore reasonable to conclude that the great majority of those athletes who are currently competing at the elite level of the sport have, for the most part, charted their own courses to get to the top.

Therefore, curlers who are currently part of the National Team Program represent a significant, and largely untapped, source of experiential knowledge with respect to the attainment of elite-level curling expertise. However, those National Team Program curlers who have previously won a major international championship (i.e., and Olympics or World Championship) are also in a position to offer insight into the expertise that is required to achieve world-leading results. With this in mind, this study took an in-depth look at the career histories of four international champions, who were still part of Curling Canada's National Team Program, in order to better understand the attainment and refinement of their elite-level curling expertise.

Chapter 2: Literature

The theoretical rationale for this study comes from a wide range of academic literature related to talent and athlete development. One of the most relevant studies in this area was conducted by Gulbin, Oldenziel, Weissensteiner, and Gagne (2010), and examined the developmental experiences of 673 Australian high-performance athletes from 34 different sports. This study verified that the development of athletic expertise is affected by an array of *personal factors* (i.e., those internal to the athlete), *contextual factors* (i.e., those in the athlete's environment), and *process factors* (i.e., those directly related to training and/or competition).

With respect to personal factors, Gulbin et al. (2010) showed that 63% of the athletes in their study felt that they had gifts or natural abilities before they ever began competing in their sport, with the most commonly cited ones being coordination, sense of the game, mental strength, physical strength, speed, and endurance. Furthermore, although 53% of these athletes felt they had encountered significant obstacles during their developing years, the great majority never entertained the possibility of quitting. In terms of motivation to advance, although 'love to practice the sport' was the most common reason cited overall, it is interesting to note that athletes at lower competitive levels seemed to be propelled by 'high natural abilities', while those at higher levels seemed to embrace a 'desire to prove something to myself'. Finally, from the standpoint of personality, 79% of these athletes saw themselves as 'being competitive', while 78% identified with 'being coachable' and with 'showing perseverance and determination when facing obstacles'.

As far as contextual factors are concerned, Gulbin et al. (2010) determined that 82%

of fathers, 66% of mothers, and 83% of siblings had participated in competitive sport. It is also interesting to note that, even though coaches were seen by their athletes as being 'critical and highly influential' at all competitive levels, their perceived importance grew steadily from 67% at the local junior level to 92% at the elite senior level. Furthermore, at lower competitive levels the 'ability to motivate and encourage' and 'teaching ability' were seen as being the most important qualities in a coach, while at higher competitive levels a 'detailed knowledge of the sport' and a 'strong insistence on perfection' were emphasized.

Finally, as it relates to process factors, Gulbin et al. (2010) found that on average the athletes in their study started participating in their sport at age-8.4, graduated to the junior national level at age-16.2, to the senior national level at age-19.6, to the senior World Championship level at age-21.5, and to the Olympic Games level at age-23.7. As for their training investments, these athletes were found to have averaged 4.9 hours/week at the local junior level, and to have increased their investment at each level until it reached 21.8 hours at the senior national/international level. Finally, in terms of their involvement in other sports, these athletes were found to have participated in an average of three sports beyond their main one, with 22% of them reaching at least the national level.

Beyond substantiating the multi-faceted nature of the development of athletic expertise, the Gulbin et al. (2010) study provides valuable insight into some of the realities associated with the life of a high-performance athlete. With this said, their study was not without its limitations from a research perspective, with perhaps the most significant being that very few distinctions were made between the 'advanced', 'pre-elite', and 'elite' cohorts within their athlete sample. Consequently, the necessary steps towards elite status are unclear. However, these researchers acknowledged this limitation by noting that

additional research is needed to better understand the pathways taken by those athletes who have successfully reached and excelled at the elite level. They also suggested that more attention should be paid to sport-specific pathways, since each sport could have its own distinct developmental realities.

The current study has taken both of these suggestions into account by undertaking an in-depth examination of the career histories of a four international champions in the sport of curling. With this said, the theoretical rationale for the current study extends beyond filling the gaps that emerged from the Gulbin et al. (2010) study. More specifically, it can be found in a much broader range of academic literature related to the various personal, contextual, and process factors that are thought to influence the long-term development of athletic expertise.

Personal Factors

This section includes a wide range of academic literature related to the various personal factors (i.e., those internal to the athlete) that could potentially affect the attainment and refinement of elite-level athletic expertise. It begins with a brief examination of two competing perspectives on the origins of human potential, one that is strongly developmental in nature and the other that is strongly genetic. This section then moves on to consider of the relationship between junior level and elite level competitive success, and concludes by examining the various physical and mental characteristics that are known to exist in elite athletes from a number of different sports.

As it relates to the origins of human potential, Ericsson et al., (1993) offered a perspective that has been well discussed in the academic literature. Beyond basic

anatomical considerations like height and weight, these researchers argue that all other characteristics needed to achieve expert status can in fact be developed. Otherwise, the only thing required from would-be elite performers is that they maintain a high level of motivation, since this will enable them to endure the long and arduous process of domain-specific training that eventually leads to expertise (Ericsson et al., 1993).

By contrast, Gagne (2010) proposed that those who eventually become elite performers come to the development process with certain gifts or natural abilities. According to Gagne, these gifts have strong genetic underpinnings, and span a variety of ability domains, some physical (i.e., muscular and motor control), and some mental (i.e., intellectual, creative, social, and perceptual). Furthermore, those prospects with the greatest potential to realize elite status are considered to be those who express among the top 10% of their age peers in the most relevant ability domain(s) (Gagne, 2010).

Davids and Baker (2007) attempted to reconcile these two perspectives in the sporting domain by way of an extensive review of the academic literature on the topic, and concluded that neither genetics nor development has sufficient explanatory power to account for observable differences in athletic performance. Moreover, they made the case that the combined contribution of these two factors effectively means that “performers with a more favourable genotype, who interact with appropriate training environments, are more likely to receive a greater training response” (Davids & Baker, 2007; p. 976). It therefore seems appropriate to take a balanced perspective that recognizes that both genetics and development contribute to elite-level expertise.

As part of a focused review of the literature, Tranckle and Cushion (2006) discussed the role of giftedness and talent in sport, and made the case that it might be best expressed

by the rate and ease learning. Accordingly, they called on those involved with or interested in athlete selection to “take a more careful look at an individual’s aptitude for learning within a domain rather than what they have already been fortunate enough to have been taught” (Tranckle and Cushion, 2006; p. 272). In other words, to look beyond young athletes’ current performance levels, and towards their learning capacity as a means of gauging future potential.

Along related lines, in a conceptual article on athlete development, Gulbin et al. (2013) took the perspective that, “talent is an expression of systematically developed skills resulting from an interaction of both nature and nurture” (Gulbin et al., 2013; p. 1,325). Furthermore, they suggested that athletic talent manifests itself as increasingly superior performances that follow a relatively predictable progression. This progression includes: 1) an initial demonstration of high-performance potential 2) a verification of this potential through extended involvement, 3) enhanced training and competitive success, and 4) a breakthrough performance that leads to an elite-level opportunity. According to Gulbin and colleagues, such a breakthrough performance typically carries with it enhanced coaching, training, and competition support, but is not a guarantee of success.

Martindale, Collins, and Abraham (2007) took this final thought one step further as part of their study of the experiences and perspectives of 16 accomplished British development coaches drawn from a wide range of different sports. More specifically, they reported that these coaches considered age group success to be a poor indicator of eventual elite level success. Accordingly, these researchers noted that, “it was seen as extremely difficult to identify those athletes who will eventually reach the top, and without a change in the emphasis on age group success, problems will continue to exist”

(Martindale et al., 2007; p. 198).

The potential drawbacks of using junior-level performances as an indicator of future elite-level success were also examined by Güllich and Emrich (2014) as part of a retrospective study on 1,558 German high-performance athletes representing 47 Olympic sports. Their study found that there was no significant correlation between those athletes who had excelled at the junior level and those who eventually went on to succeed at the senior international level. In discussing this finding, these researchers noted that, “developmental practice patterns leading to early adolescent success and to long-term senior world-class success were inconsistent and in some cases contradictory” (Güllich & Emrich, 2014; p. S391).

Therefore, there could be merit in looking for another way to differentiate those athletes who will eventually reach the elite level of their sport from those who will not. To this end, Till et al. (2011) showed that certain physical characteristics could be used to differentiate national junior athletes from regional junior athletes. More specifically, they analyzed the physical testing results of a total of 1,172 rugby league players between ages 13 and 15 (national $n = 302$, regional $n = 870$), and identified a number of anthropometric and physiological measures that separated these two groups. With this said, their results showed that such physical measures only accounted for 28.7% of the variance between these athletes, meaning that the remaining 71.3% was accounted for by other variables.

Smith (2003) argued that there are essentially two types of athletes in competitive sport, those with highly favourable genetics (a.k.a. ‘thoroughbreds’), and those with a highly developed work ethic (a.k.a. ‘workhorses’). Despite the differences that exist between these athletes, Smith believes that “by ensuring appropriate training is provided

to suit the requirements of each individual athlete, the chances of making a workhorse more like a thoroughbred are increased and with correct peaking, a workhorse may also be highly competitive” (Smith, 2003; p. 1,109). In other words, even those athletes with less than ideal physical capabilities can still succeed with a strong enough work ethic.

Based on their extensive and systematic review of the most recent academic literature on the topic, Rees et al. (2016) confirmed that physical differences do indeed to exist between more and less successful athletes at all competitive levels. However, they also cautioned that these findings have generally been over-interpreted, and are often confounded by significant differences in biological maturation among adolescent athletes of the same chronological age. In commenting on these maturational realities, these researchers noted that, “changes during puberty make the prediction of adult performance from adolescent data challenging” (Rees et al., 2016; p. 1,045).

Moving beyond their physical attributes, Gould, Dieffenbach, and Moffett (2002) studied the mental characteristics of 10 American Olympic champions from a variety of different team and individual sports. Based on the results of a battery of psychological tests, these researchers found that the athletes in their sample were characterized by: the ability to control of anxiety, confidence, mental toughness, sport intelligence, the ability to focus, competitiveness, goal setting and achievement, coachability, high dispositional hope, optimism, and adaptive perfectionism. They also found that a wide range of individuals and institutions were involved in the development of these characteristics, and that, “their ways of influence were both direct, such as teaching or emphasizing certain psychological lessons, and indirect, involving modeling or unknowingly creating certain psychological environments” (Gould et al., 2002; p.199).

Building on these findings, Collins, McNamara, and McCarthy (2016) identified several mental characteristics that differentiated athletes with superior records of success from less accomplished athletes. These researchers studied 54 western European athletes divided into 18 sport-matched triads, with each triad including a ‘super champion’ (i.e., an athlete with a long record of success at the elite level), ‘champions’ (i.e., an athlete with a limited record of success at the elite level), and ‘almost’ (i.e., those who plateaued just before the elite-level). Their results showed that the super champions were more likely to be intrinsically motivated than their less accomplished counterparts, with this motivation shaping how they perceived their progress. These super champions were also unique in their response to adversity in that they were found to be “almost fanatical in their reaction to challenge, both proactively and in reaction to mishaps,” (Collins et al., 2016; p. 5).

Finally, Lizmore, Dunn, and Causgrove-Dunn (2016) focused in on the construct of perfectionism in their study of 343 male World Curling Tour competitors. The specific purpose of their study was to examine the responses of different types of perfectionists to low and high criticality situations. Their results showed that, regardless of the situation, healthy (aka adaptive) perfectionists (i.e., those who strive to achieve high performance standards) responded to mistakes with lower levels of anger and dejection and higher levels of self-confidence and optimism than unhealthy (aka maladaptive) perfectionists (i.e., those concerned about failing to achieve high performance standards). In commenting on this finding, the researchers noted that, “healthy perfectionistic athletes appear to have more adaptive emotional and cognitive responses to mistakes than unhealthy perfectionists” (Lizmore et al., 2016, p. 96).

Based on the literature presented in this section, it is clear that the attainment

and/or refinement of elite-level curling expertise can be affected by a wide range of personal factors. With this in mind, the current study has been designed to: 1) *establish whether its' curlers felt that they had gifts or natural abilities that gave them an advantage over their age-group peers, and if so whether this manifested itself in superior pre-men's performances*; and 2) *determine whether they displayed the physical and mental characteristics that have been shown to exist in other elite athletes.*

Contextual Factors

This section includes wide range of academic literature related to the various contextual factors (i.e., those in the athlete's environment) that could potentially affect the attainment and refinement of athletic expertise. It begins with an examination of certain cultural, geographical, and organizational forces that are known to operate on the 'macro level' of the athlete's environment. It then moves on to examine some key 'micro level' considerations, with a particular emphasis on the developmental roles played by those with close proximity to these athletes, namely their coaches and family members.

As part of an extensive literature review, Williams and Ford (2008) discussed how a sport's cultural significance in a given country might influence the timing of a young athlete's initiation into that sport. More specifically, using the examples of the soccer in Europe and South America, rugby in New Zealand, and handball in Denmark, where these sports are very much a part of the national identity, they argued that "it may be that early engagement is a prerequisite if athletes are to accumulate the amount of practice time needed to be competitive in that sport" (Williams & Ford, 2008; p. 7). In other words, when

a sport is particularly popular in a given country, as curling is in Canada, there may be little choice but to have aspiring young athletes become involved at a young age.

From a geographical perspective, there is strong evidence to suggest that a disproportionately large number of professional athletes were born in communities with populations of less than 50,000. More specifically, Côté, MacDonald, Baker, and Abernethy (2006) showed that American professional male athletes from the sports of hockey, baseball, basketball, and golf ($n = 1,691$) were considerably more likely to come from these smaller communities than was the general population. According to these researchers, smaller communities tend to offer a safer environment, ready access to facilities, and closer relationships with coaches. With this in mind, they concluded that these communities “could offer increased opportunities to experience early success in sport, which in turn would increase self-efficacy and the motivational drive to play and practice more” (Côté et al., 2006; p. 1,072).

Balish and Côté (2013) offered additional insight in this regard in a unique case study on the small but highly successful sporting community of Lockeport, Nova Scotia (population 646), which had won 10 provincial high school championships over a 10-year period. Based on interviews with 22 athletes, coaches, and supporters, Balish and Côté identified several elements that contributed to Lockeport’s tremendous success. One key element identified was the fact that, rather than focusing on one age group, coaches tended to start coaching a group of young athletes and then stayed with that group until they graduated from high school. Another key element was the fact that younger and older athletes often took part in informal practices and scrimmages together. To this end, the researchers noted that, “within this mixed-age environment, athletes described an

inclusive yet hierarchal learning environment where older athletes were respected and possessed an informal authority” (Balish & Côté, 2013; p.111).

Moving on to the organizational level of the athlete’s environment, Henriksen, Stambulova, and Roessler (2010a, 2010b, and 2011), conducted in-depth case studies on three highly successful Scandinavian sporting organizations with the goal of exploring factors related to their success. These organizations were the National 49er Sailing Team in Denmark (Henriksen et al., 2010a), the IFK Växjö Track and Field Club in Sweden (Henriksen et al., 2010b), and the Wang School of Elite Sports Kayak Team in Norway (Henriksen et al., 2011), with all being shown to have proven track records of producing international champions. Henriksen et al. (2011) identified a key similarity among these organizations, the fact that the daily training environment allowed for meaningful interactions between prospects and already-elite athletes. In commenting on this similarity, the researchers noted that, “elite athletes were really visible as role models, and arguably training with the elite level athletes may prepare the prospects for the next phase in their athletic career” (Henriksen et al., 2011; p. 357).

Vallée and Bloom (2005) offered additional insight into the organizational level in their study of five successful CIS women’s basketball and volleyball programs that had won domestic championships, and had advanced athletes to the international level. More specifically, based on interviews with the five head coaches, Vallée and Bloom identified several key elements that effectively connected these coaches to the programs that they built. These elements included the coaches’ personal attributes and leadership capabilities, the coaches’ desire to foster their athletes’ personal growth, the coaches’ use of their organizational skills to plan and prepare their teams, and the coaches’ vision for their

programs and their ability to get their athletes to buy-in to it. In commenting on this final element, the researchers noted that these coaches' vision may well have been the unifying element that led to their programs' success, and described it as including "the coaches' goals and direction for their programs, as well as the introduction and selling of their coaching philosophy to their athletes" (Vallée & Bloom, 2005; p. 189).

With these elements in mind, it is clear that coaches can make a variety of important contributions to helping their athletes to develop expertise. However, Côté and Gilbert (2009) pointed out that coaches' contributions are typically quite different depending on the particular context in which they operate. To this end, they made the distinction between 'participation coaches' and 'performance coaches', and argued that former is charged with creating an environment where enjoyment is emphasized while the latter is charged with creating one that features a strong emphasis on excellence.

Along these lines, Brylinsky (2010) pointed out that participation coaches have the potential to provide young athletes with a lasting advantage that extends well into their competitive careers. More specifically, it is her view that participation coaches should devote their practice time to a combination of action-based instruction and loosely structured play, which she believes will enhance their athletes' learning and enjoyment. To this end, she put forward the perspective that "coaches plan for informal training situations that encourage improvisation and role playing rather than pure repetition" (Brylinsky, 2010; p. 23).

On the other end of the spectrum, Côté and Sedgwick (2003) provided insight into the roles played by 10 performance coaches associated with Canadian national rowing team, and did so based on the perspectives of the elite rowers being coached. The results

showed that these coaches were seen by their athletes to: plan proactively for training and competition, facilitate goal setting, create a positive training environment, build athlete confidence, recognize individual differences, and establish a positive rapport with each athlete. Significantly, they were also found to teach skills effectively through instruction, awareness, and feedback, which led the researchers to note that, “effective coaches prioritize technical instruction, focus instruction on specific technical cues, and communicate and explain instructions using analogies” (Côté & Sedgwick, 2003; p.72).

Finally, as part of their study on the developmental experiences of eight English junior elite golfers, Hayman, Polman, Taylor, Hemmings, and Borkoles (2011) showed how parents can sometimes play direct roles in their child-athlete’s development. For example, when asked about their main motivation for getting involved in the sport, all golfers cited their fathers, who without exception were low-handicap golfers themselves. Significantly, Hayman and colleagues also found that fathers served as informal coaches and mentors until between ages-14 and 16, when the young golfers began to work with more qualified golf coaches. In commenting on this finding the researchers noted that this informal coaching role, “highlights the reliance the golfers placed upon their fathers within the context of their golf development” (Hayman et al.; p. 257).

Based on the literature presented in this section, it is clear that the attainment and/or refinement of elite-level curling expertise can potentially be affected by a wide range of contextual factors. With this in mind, the current study has been designed to: 1) *determine whether certain cultural, geographical, and/or organizational forces impacted its’ curlers’ development:* and 2) *examine the direct developmental roles played by those with close proximity to these curlers, including their coaches, teammates, and family members.*

Process Factors

This section includes wide range of academic literature related the various process factors (i.e., those directly related to training and/or competition) that could potentially affect the attainment and/or refinement of athletic expertise. It is organized into three distinct sub-sections, with each focused on the literature surrounding a leading model of athlete development. These models include the Expert Performance Theoretical Framework (Ericsson, et al., 1993), the Developmental Model of Sport Participation (Côté, Horton, MacDonald, and Wilkes, 2009), and the Long-Term Athlete Development Framework (Canadian Sport for Life, 2014).

Expert Performance Theoretical Framework

Originally proposed by Ericsson et al. (1993), the Expert Performance Theoretical Framework (EPTF) is built around the idea that “the amount of time that an individual is engaged in deliberate practice activities is monotonically related to that individual’s acquired performance” (p. 367). Deliberate practice is considered to involve structured training activities that are specifically designed to improve current performance, to require full effort and attention, and to offer opportunities for repetition, immediate feedback, and error detection and correction. According to Ericsson and colleagues, deliberate practice is distinct from other domain-related activities like competition and play. To this end, they see competition as a specialized form of work that offers insufficient opportunities for participants to improve specific weaknesses, and play as an activity that is mainly focused on enjoyment rather than on improvement.

The EPTF also acknowledges that it takes time to become an expert in any field. In

fact, according to Ericsson et al. (1993), this process involves a minimum investment of 10 years or 10,000 hours. They therefore strongly endorse the idea of initiating involvement in deliberate practice at an early age, and suggest that this may also be closely tied to the level of elite performance that is eventually achieved. In commenting on these temporal considerations, these researchers argued that, “across many domains of expertise, a remarkably consistent pattern emerges: the best individuals start practice at earlier ages, and maintain a higher level of daily practice” (Ericsson et al., 1993; p. 392).

According to Ericsson et al. (1993) the development of expertise can also be affected by three important constraints: resources, effort, and motivation. The resource constraint recognizes that access to deliberate practice involves a considerable investment of time and money, which is something that typically falls to parents in the early years of a prospect’s development. The effort constraint is based on the premise that, although capacity can increase over time, distinct limits exist in the amount of practice that individuals’ can endure on a daily basis (i.e., no more than four hours). Finally, the motivation constraint is rooted in Ericsson and colleagues’ assertion that deliberate practice is not inherently enjoyable, and that individuals must therefore be driven by the desire to become expert performers.

Ericsson et al. (1993) developed many of their theories as part of a study on the practice histories of musicians of different skill levels. The core component of this study began with a comparison of deliberate practice investments of 30 young violinists (average age 23.1 years) from an elite music academy, including 10 judged by their professors to be the ‘best violinists’, 10 judged to be ‘good violinists’, and 10 less skilled ‘music students’ studying to be teachers rather than performers. On the basis of retrospective interviews

with these violinists, the best group was found to have accumulated an average of 7,410 deliberate practice hours by age-18, as compared to 5,401 hours by the good group, and 3,420 hours by the music student group. In commenting on these results, the researchers pointed out that, “there is complete correspondence between the skill level of the groups and their average accumulation of practice time alone with the violin” (Ericsson et al., 1993; p. 379).

As further evidence of the relationship between deliberate practice and expert performance, Ericsson and colleagues compared the above-mentioned figures to those reported by 10 expert violinists (average age 50.5 years), who were all current members of an internationally recognized orchestra. Using the same retrospective interview techniques as were used with the younger violinists, these researchers determined that these expert violinists had accumulated an average of 7,336 deliberate practice hours by age-18. In commenting on the remarkable closeness of this figure to that of the best young violinists (i.e., 7,410 hours) they noted that, “this finding was expected because the most likely career for the best violinists is membership in a first-rate orchestra” (Ericsson et al., p. 380). In other words, that expert performance could essentially be predicted based of their commitment to deliberate practice.

Following its initial grounding in music, the EPTF been applied to numerous other domains, including sport. However, according to Ericsson, Preitula, and Cokley (2007), regardless of the domain, expertise is a tangible construct that must pass three distinct tests. First, it must lead to performances that are superior to the great majority of the expert’s peers. Second, expertise must produce concrete results that are recognized within the domain in which the expert operates. Third, it must be able to be replicated and

measured, typically in a laboratory setting. However, as it relates to this final test, Ericsson and colleagues acknowledge that field tests can also be quite appropriate in certain domains, including sport. “Skill in some fields, such as sports, is easy to measure. Competitions are standardized so that everyone competes in a similar environment (Ericsson et al., 2007; p. 20).

Williams and Ford (2008) noted that sport-related research has consistently found all forms of practice to be enjoyable, and as such requirements for deliberate practice have typically been adjusted accordingly. Furthermore, they noted that, despite the original emphasis by Ericsson et al. (1993) on practice alone, deliberate practice has been typically been operationalized in sport to include both team and individual practice. Based on an extensive review of the literature, Williams and Ford demonstrated that deliberate practice has been found to lead to meaningful adaptations in advance cue utilization, pattern recognition, visual search behaviors, situational probabilities and expectations, and strategic decision-making. In discussing these tactical adaptations, they suggested that, “when compared with novices, experts restructure, reorganize, and refine their representation of knowledge so that they are able to adapt rapidly to changes in situational demands” (Williams & Ford, 2008; p. 10).

In an intriguing study that used a variety of historical publications to analyze the practice habits of legendary golfer Ben Hogan, Jenkins (2010) demonstrated that Hogan’s practice routines met the original requirements of deliberate practice, except that he found working on his game to be enjoyable and was able to sustain practice sessions longer than would typically be predicted (i.e., up to six hours). Furthermore, Jenkins made the case that Hogan’s long-term commitment to deliberate practice enabled him to achieve a truly

integrated understanding of his game. Accordingly, he noted that, “it can be argued that Hogan’s swing theory, which was based on a small number of fundamentals, became more integrated in terms of both his spatial and temporal understanding” (Jenkins, 2010; p. 18). Finally, this study showed that Hogan’s deliberate practice had several different purposes, including new skill acquisition, existing skill maintenance, and preparation for competition.

In a commentary on the Jenkins (2010) study, Ericsson and Hill (2010) reinforced the idea that the results of the many shots that Hogan played during his practice sessions provided him with the type of feedback that is a necessary element of deliberate practice. They also argued that that Hogan likely took structured breaks during his practice sessions, and therefore did not exceed the established time limits on deliberate practice. Finally, they encouraged other researchers to analyze the practice activities of truly elite athletes and noted that, “only when we get down to detailed descriptions of the practice activities that were necessary to attain their successful performance will we be able to provide current and future athletes with sufficiently detailed information so they can gain maximal benefits of past athletes experiences” (Ericsson & Hill, 2010; p. 25).

In another commentary on the Jenkins (2010) study, Cobley and Baker (2010) pointed out that deliberate practice might not have been the only activity that contributed to Hogan’s expertise. More specifically, they highlighted two additional activities noted by Jenkins (i.e., observation and modeling of others, and technical and tactical discussions with peers), and argued that both were instrumental in Hogan’s development. With this in mind, they made the case that, although deliberate practice is important, an exclusive focus on it may dismiss “the potential value of diverse practice types which at given points may directly impact skill learning, or indirectly underpin the level of engagement, functional

content and effectiveness of [deliberate practice]” (Cobley & Baker, 2010; p. 32).

Ward, Hodges, Williams, and Starkes (2007) compared the developmental histories of 203 youth soccer players (ages-8 to 18) representing two distinct skill levels: junior-elite soccer players involved in English soccer academies and non-elite soccer players from nearby educational institutions. Their results showed that the main difference between these groups was related to time spent in soccer-specific team practice, with the junior-elite group accumulating considerably more hours than the non-elite group. On the other hand, these researchers found no significant differences between these groups with respect to time spent in other domain-specific activities (i.e., individual soccer practice, playful soccer activities, or structured soccer games). Significantly, this study also determined that several training activities (i.e., technical practice, tactical practice, soccer games, physical training, and soccer viewing) were all found to be highly relevant to improving performance. However, the researchers noted that only tactical practice met all the requirements of sport-specific deliberate practice (i.e., relevance, effort, and concentration) in the eyes of the elite group.

In an important follow up to the Ward et al. (2007) study, Ford, Ward, Hodges, and Williams, (2009) used the original data to attempt to account for eventual differences in expertise. More specifically, the Ford et al. (2009) study compared a group of 11 players (now ages 16 to 18) who were offered entry-level professional contracts (still-elite) to an age-matched group of 11 players who had been de-selected from their academies (ex-elite). Their results showed that even though these two groups of players had accumulated the same amount of soccer practice (i.e. combined team and individual) between ages 6 and 12, the still-elite group invested more than double the hours in soccer play during this same

period. Based on these results, the researchers suggested that, “when supported by extensive hours in soccer practice, time spent in soccer play significantly contributed to success, as long as the majority of time was not spent in soccer play” (Ford et al., 2009; p. 74). In discussing this suggested, these researchers noted that soccer play might help to counter-balance grueling deliberate practice activities, and thereby might enhance athletes’ motivation to stay involved.

Based on the literature presented in this section it is clear that the EMPF, originally proposed by Ericsson et al. (1993), includes a key ingredient that is essential to developing elite-level athletic expertise: a strong commitment to deliberate practice. However, there is also evidence to suggest that certain other activities, like sport-specific play, observation and modeling, and discussions with peers, might also play meaningful roles in this regard. With these considerations in mind, the current study has been designed to: 1) *examine the contribution of all sport-specific training activities to its curlers’ development*, and 2) *consider the nature and extent of their investments in different types of training (i.e., technical, tactical, physical, and mental), at all ages and stages of their careers*.

Developmental Model of Sport Participation

The Developmental Model of Sport Participation (DMSP) emerged from a study by Côté (1999) on the role of family members in the development of junior elite athletes, but that also ended up identifying a number of distinct stages of athlete development. The first stage was labeled the ‘Sampling Years’ (ages 6-12), during which the young athletes were found to participate in a wide range of sports. This was followed by the ‘Specializing Years’ (ages 13-15), during which they narrowed their involvement to one or two sports and

began to increase their commitment to them. The final identified stage in these athletes' progression was the 'Investment Years' (ages 16 and up), during which they focused primarily on a single sport, and undertook an intense training and competition schedule. However, recognizing that the three identified stages only accounted for childhood and adolescence, Côté indicated that there may be reason to consider "the existence of a fourth stage marked by maintenance and perfection of skills" (Côté, 1999; p. 412).

With this potential fourth stage in mind, Durand-Bush and Salmela (2002) examined the development and maintenance of expertise among ten Canadian athletes, who had each won at least two gold medals at the Olympic Games and/or at World Championships. Their results showed that these athletes took part in a wide range of sports during the Sampling Years, and that this diverse involvement helped them to develop certain personal characteristics and physical attributes. Then, during the Specializing Years, they were found to devote greater time and effort to fewer sports, with both training and competition now becoming more structured. As for the Investment Years, these researchers determined that training now included significant physical, mental, technical, and tactical elements, and that athletes treated most competitions as opportunities to test their skills and evaluate their ongoing progress.

With this said, much like the current study, Durand-Bush and Salmela (2002) were not just interested in the development of expertise, but its maintenance as well, and therefore examined these athletes' approaches during what they called the 'Maintenance Years' (i.e., after these athletes won their first gold medals). Their results for this timeframe showed that physical, mental, technical, and tactical training were all still seen as being highly important, and that athletes found ways to become increasingly

comfortable with major competitions. With this said, two new points of emphasis emerged during the Maintenance Years: 1) a recognition of the importance of rest and regeneration, and 2) a strong commitment to creativity and innovation.

Although Durand-Bush and Salmela (2002) confirmed the relevance of fourth stage, it was not included in the final iteration of the DMSP as presented by Côté et al. (2009). Instead, this iteration focused exclusively on the development of expertise through childhood and adolescence, and within these time parameters acknowledged that there is more than one route to becoming an elite athlete. More specifically, Côté and colleagues identified two distinct routes to the elite level of sport: the Early Specialization Pathway and the Early Sampling Pathway. The Early Specialization Pathway is aimed at sports where athletes must perform at a high level before puberty, and much like the EPTF (Ericsson et al., 1993) calls for a strong emphasis on sport-specific deliberate practice beginning in childhood.

The Early Sampling Pathway, on the other hand, is the recommended approach for all other sports, and promotes diversified sporting involvement during the Sampling Years followed by a progressively tighter focus during the Specializing and Investment Years. The Early Sampling Pathway also features a stage-appropriate emphasis on an activity known as ‘deliberate play’, which according to Côté and colleagues is an activity that involves modified, age-adapted rules and that is typically set-up by a participating child or adult. Furthermore, it is their contention that deliberate play provides “a context that fosters intrinsic motivation to participate in sports by providing greater amounts of ‘time-on-task’ rather than waiting for the next drill to begin” (Côté et al., 2009; p. 8).

According to Côté and Fraser-Thomas (2008), the DMSP is not aligned with the 10,000-hour deliberate practice target associated with the EPTF (Ericsson et al., 1993), but could have a corresponding metric of its own. More specifically, they suggested that, when all developmental activities are taken into consideration (i.e., deliberate practice, deliberate play, and organized competition in the main sport, plus all other sport involvement), athletes could conceivably reach an aggregate total of 10,000 hours by the time they attain elite-level expertise.

Soberlak and Côté (2003) took an in-depth look at the developmental investments of four Canadian ice hockey players (all age-20) who had recently signed National Hockey League (NHL) contracts (i.e., their study's standard for elite status). Their results showed that on average these hockey players had invested 3,072 hours in deliberate practice (i.e., on and off-ice hockey-related training) 3,506 hours in deliberate play (i.e., on and off-ice hockey related play), and 2,436 hours in competition (i.e., organized hockey games). Significantly, this study also determined that these hockey players had invested 2,308 hours in other sports (i.e., deliberate practice, deliberate play, and competition), which when combined with their sport-specific investments equates to an aggregate total of 11,332 sporting hours. It should be noted that this aggregate total lends some support to the aggregate 10,000-hour metric put forward by Côté and Fraser-Thomas (2008).

However, it should also be noted that this is not the only aggregate total that has emerged from the literature. Instead, Baker, Côté, and Abernathy (2003) quantified the aggregate sport-specific investments (i.e., all main sport training and competition activities) of 15 Australian national team athletes (average age-27.6) from the sports of basketball ($n = 4$), field hockey ($n = 8$), and netball ($n = 3$). Their results showed that these

athletes had invested an average of 12.9 years and 3,939 sport-specific hours when they became national team members. With this said, Baker and colleagues also found that considerable variability existed from sport to sport, with the basketball players averaging 11.0 years and 5,909 hours, the field hockey players averaging 13.8 years and 3,584 hours, and the netball players averaging 13.3 years and 2,260 hours. These results suggest that, although at least 10 years were required for these athletes to attain elite-level sporting expertise (i.e., national team selection), considerable variability existed in their hourly investments from sport to sport. This variability is reinforced by the hockey data reported in the Soberlak and Côté (2003) study, whereby a sport-specific total of 9,014 hours can be calculated when their practice, play, and competition totals are combined.

Moving beyond their yearly and hourly investments, Hayman et al. (2011) offered another useful perspective that supports the basic timelines associated with the DMSP's Early Sampling Pathway. These researchers identified several key developmental milestones in their study of eight junior-elite golfers (average age-18.8) who were part of an English international team. More specifically, they determined that these golfers were on average age-9.5 when they started playing golf, age-11.1 when they initiated golf-specific practice (i.e., during the Sampling Years), age-13.0 when they first started working with a qualified golf coach, and age-14.9 when they decided to specialize in golf (i.e., during the Specializing Years).

Güllich and Emrich (2014) provided additional insight into this final milestone as part of their study on the developmental histories of 1,558 German high performance athletes. More specifically, they found that those athletes who competed regularly on the international stage had specialized in their main sport significantly later than those who

were mainly national competitors (age-14.4 vs. age-12.1). They also found that the international athletes were more likely to have had extensive other sport training (66% vs. 51%) and other sport competition (53% vs. 39%) throughout their development. With these findings in mind, the researchers concluded that, “the relation of attained success with the volume and domain-specificity of practice is neither linear nor monotonic across age and success levels,” (Güllich & Emrich, 2014; p. S394).

This line of thinking was somewhat contrary to the findings of Baker et al. (2003) in their study of Australian team sport athletes. These researchers compared the developmental histories of the 15 national team athletes in their sample with 13 regional level competitors. Their results showed that, even though both groups had experienced similar sporting diversity before age-12, the national team athletes reduced their other sport involvement significantly between ages 12 and 17 while the regional level athletes did not. Baker and colleagues used these findings to make the case that, “expertise in team sport may be meaningfully investigated by examining changes in forms of practice and associated activities throughout the developmental career span of expert athletes” (Baker et al., 2003, p. 23).

Berry, Abernethy, and Côté (2008) also examined the contribution of other sport involvement to two groups of professional Australian Football League (AFL) players who were nominated by their coaches as either expert or less skilled decision-makers. Their results showed that the expert decision-makers had accumulated significantly more hours in invasion-type games before entering AFL competition than had the less skilled ones. Based on these results, the researchers argued that, “some transfer of learning is possible across different types of activities and that experience in activities other than, or additional

to, Australian football is beneficial for the development of expert perception and decision making” (Berry et al., 2009; p. 705). It should be noted that these findings go well beyond the predictions of the DMSP, which frames sampling as an opportunity for children to gauge their interest in sports rather than as a direct means of skill acquisition.

Finally, the International Olympic Committee (IOC) recently released a consensus statement on youth athletic development (Bergeron et al., 2016), which highlights some potential negative consequences associated with premature single-sport specialization, including overuse injuries and burnout. This statement suggests that multi-sport sampling could be a means of avoiding these problems, and of giving young athletes the best possible opportunity to identify the sport that is right for them. However, building on this suggestion the researchers note notes, “the message would be reinforced with more definitive evidence indicating that children who participate in a variety of sports and specialize only after the age of puberty, for example, tend to be more consistent performers” (Bergeron et al., 2016; p. 3).

Based on the literature presented in this section it is clear that the DMSP, as presented by Côté et al. (2009), promotes the benefits of diversified sporting involvement and deliberate play in childhood and early adolescence. However, beyond acknowledging the need for single-sport specialization and high levels of deliberate practice, this model offers very few specifics as to what aspiring elite athletes need to do in late adolescence and adulthood. With these considerations in mind, the current study has been designed to:

- 1) *examine all aspects of its' curlers' sporting involvement, including their main and other sport activities, at all ages and stages of their careers; and*
- 2) *consider the merits of adding a fourth stage to the DSMP, which would be focused on the refinement of elite-level expertise.*

Long-Term Athlete Development Framework

The Long-Term Athlete Development Framework, or as it is more commonly known, LTAD, is a comprehensive model that integrates training, competition, and recovery in a multi-stage manner. LTAD was originally put forward in Canada by Balyi, Way, Norris, Cardinal, and Higgs, (2005), and was officially adopted by Sport Canada shortly thereafter. Accordingly, all governing bodies within the Canadian sport system, including the Curling Canada, have been required to employ LTAD as their framework for athlete development ever since. With this said, Canadian Sport for Life (2014) released an updated version, known as LTAD 2.0, which is based on more recent research and lessons learned during the implementation process.

LTAD includes the following six stages in its competitive pathway: Active Start (ages 0-6), FUNdamentals (ages 6-9, males; ages 6-8, females), Learn to Train (ages 9-12, males; ages 8-11, females), Train to Train (ages 12-16, males; ages 11-15, females), Train to Compete (16-23, males; 15-21, females), and Train to Win (ages 19+, males; ages 18+, females). The first three stages of LTAD (i.e., Active Start, FUNdamentals, and Learn to Train) are intended to work together to encourage the development of ‘physical literacy’, which according to Canadian Sport for Life (2014) means having “the confidence, competence, and motivation to enjoy a variety of sports and physical activities.” (p.54). Then, with an appropriate foundation in place, the remaining three stages (i.e., Train to Train, Train to Compete, Train to Win) are focused on excellence, and ultimately on reaching the elite level of their sport.

A key feature of LTAD is its recognition that it takes at least 10 years, and potentially 10,000 hours, to achieve elite status. However, Canadian Sport for Life differs from

Ericsson et al. (1993) in that they have not specified that this hourly total apply to any one developmental activity (e.g. deliberate practice). In fact, they point out that, “LTAD emphasizes a multi-sport approach: all former activities should be included as they are an integral part of the 10,000 hours” (Canadian Sport for Life, 2014; p. 43). In this sense, Canadian Sport for Life’s approach seems comparable to the aggregate metric suggested by Côté and Fraser-Thomas (2008), whereby all developmental activities (i.e., sport-specific training and competition, and other sport involvement) are combined.

Another key feature of LTAD is the importance that it gives to periodization of training and calendar planning of competitions. More specifically, its’ developers note that periodization of training “provides a framework for arranging a complex array of training processes into a logical and scientifically-based schedule to bring about optimal improvements in performance” (Canadian Sport for Life, 2014; p. 38). Furthermore, they point out that calendar planning of competitions makes it possible to target and prepare for the most important competitive events of the season, while striking an appropriate balance with respect to training loads. With these two elements in mind, LTAD offers the following generic guidelines with respect stage-by-stage training to competition ratios: Learn to Train (70:30), Train to Train (60:40), Train to Compete (40:60), and Train to Win (25:75).

With this said, Canadian Sport for Life (2014) emphasizes that these guidelines are subject to change based on sport-specific realities, and as such leaves the final training to competition ratios to each sport’s discretion. To this end, Curling Canada’s LTAD (Dagg-Jackson, et al., 2008) offers its own guidelines with respect to curling-related training to competition ratios. More specifically, it recommends the following: Learn to Train (50:50), Train to Train (67:33), Train to Compete (75:25), and Train to Win (80:20). However, it is

noteworthy that these training to competition ratios are considerably different from the generic ones put forward by Canadian Sport for Life, and in some cases are essentially their polar opposites.

Canadian Sport for Life (2014) also offers sport-specific latitude with respect to the timing and structure of the final two stages of LTAD (i.e., Train to Compete and Train to Win). More specifically, with distinct competition structures in place in both the under 18 and under 21 age categories, Curling Canada's LTAD (Dagg-Jackson et al., 2008) split its Train to Compete stage into Train to Compete 1 (ages 16-18, males; ages 15-17, females) and Train to Compete 2 (ages 18-20, both sexes). Similarly, considering the difficulty that its junior athletes often had in making the transition to adult competition, and the long careers enjoyed by the sport's most elite athletes, it also split its Train to Win stage, with Train to Win 1 (ages 21-25, both sexes) being aimed primarily at its University and La Releve Program athletes, and Train to Win 2 (ages 24+, both sexes) exclusively at its National Team Program athletes.

As for its earlier stages, Curling Canada's LTAD (Dagg-Jackson et al., 2008) does not mandate any curling involvement during the FUNdamentals stage (ages 6-9, males; ages 6-8, females), and instead focuses multi-sport participation. However, at the Learn to Train stage, (ages 9-12, males; ages 8-11, females), one or two weekly on-ice sessions are recommended, understanding that this could include some form of modified competition. Finally, at the Train to Train stage (ages 12-16, males; ages 11-15, females), two to three weekly ice sessions, including league play, are recommended, along with at least some participation in weekend competitions (i.e., bonspiels and playdowns).

Curling Canada's LTAD (Dagg-Jackson et al., 2008) also paints a general picture as to

how curlers' technical, tactical, physical, and mental capabilities might evolve over time, and touches on the importance of developing strong team dynamics capabilities. However, there is a distinct lack of detail with respect to what any of these capabilities should look like at each stage, and how they might be best developed. Consequently, although it offers a useful overview of the sport's developmental landscape, Curling Canada's LTAD stops well short of being a step-by-step guide.

With this said, Curling Canada has provided meaningful technical and tactical guidelines as part of its most recent coaching resources. For example, Arnold, et al. (2015) defined the technical area as being primarily related to a curler's delivery, which they see as having four distinct phases: set-up, drive, slide, and release. According to these experts, the technical area also includes a curler's individual sweeping mechanics, but not the corresponding team-based systems. These systems, whether related to sweeping or otherwise, are instead considered to be part of the sport's tactical area, which has been examined in detail by Krepps (2015).

According to Krepps, this tactical area includes six distinct processes: strategic profile, game plan, end plan, shot selection, shot tolerance, and shot management. The first three of these processes (i.e., strategic profile, game plan, and end plan) are related to key decisions that teams should make in advance of a competition, game, or end. The second three (i.e., shot selection, shot tolerance, and shot management) are related to decisions that teams must make in the lead-up to, and during any shot. Consequently, it is safe to conclude that the tactical area of curling is very much a team-based undertaking, and one that is focused on decision-making.

Unlike the technical or tactical areas, where supplementary coaching resources are

available, Curling Canada seems to align very closely with the physical and mental content contained in the original version of the LTAD framework (Balyi et al., 2005). With this in mind, it should be noted that this content is not without its critics, and that legitimate arguments have been made opposing a number of its fundamental assumptions. For instance, Holt (2010) pointed out that, contrary to its developers' claims, LTAD seems to be built around general physiological, physical training, and motor learning principles. Furthermore, he pointed out its psychological foundations are based more on best practices than on evidence-based conclusions. Accordingly, he argued that evidence is clearly needed with respect to "*which* psychological skills should be taught to young athletes, *how* to teach them, and *when* to teach them" (Holt, 2010; p. 423).

Finally, beyond being identified as important, virtually no details were offered in Curling Canada's LTAD (Dagg-Jackson et al., 2008) as to how athletes' team dynamics capabilities might be developed. The same can be said for the generic version of LTAD (Canadian Sport for Life, 2014), which actually makes no mention of these capabilities whatsoever. However, in a unique ethnographic study Holt and Sparkes (2001) offered meaningful insight into the inner workings of an English university soccer team over an eight-month period. More specifically, Holt had an insider's perspective as one of 13 team members (average age-21.9), which gave him the proximity to identify four key themes that enhanced team's cohesion. These themes included clear and accepted roles, appropriate team goals, a willingness to make sacrifices, and strong communication among team members. Further to this final theme, Holt and Sparkes noted that, "constructive information, encouragement, and support from players during games helped contribute to a more positive atmosphere that was associated with an increase in task cohesion and

performance” (Holt & Sparkes, 2001, p. 254).

Based on the literature presented in this section it is apparent that LTAD, most recently presented by Canadian Sport for Life (2014), offers a useful multi-stage framework that can be tailored to suit sport-specific realities. However, despite being the only model to discuss the importance of *both* training and competition, the training to competition ratios recommended in its generic version (Canadian Sport for Life, 2014) vs. its curling-specific version (Dagg-Jackson et al., 2008) are clearly very different. With these considerations in mind, this study has been designed to use the proven pathways followed by its curlers to: 1) *assess the stage-by-stage progression laid out in Curling Canada’s LTAD, including the merits of splitting both its Train to Compete and Train to Win stages*, and 2) *evaluate the recommended training to competition ratios, both generic and curling-specific*.

Mixed-Method Research

Based on the literature presented to this point, it is clear that athlete development is a complex undertaking that can be affected by a variety of personal, contextual, and process factors. In light of this complexity, the current study took an in-depth look at the career histories of a four highly accomplished Canadian curlers in order to answer the following research question: *how can these curlers’ histories help us to better understand the attainment and refinement of their elite-level curling expertise?* Recognizing that this question is largely exploratory in nature, and that a complete answer is likely to include both quantitative and qualitative elements, this study employed a mixed-method design.

According to Morse and Niehaus (2012), a mixed-method design includes a core element that utilizes one distinct research method, and a supplementary element that

utilizes another. In most cases, one of these methods is qualitative and the other is quantitative, with each having the potential to be either the core or supplementary element. Morse and Niehaus point out that the core element of a mixed-method design represents a complete study on its own, which can successfully answer the research question. However, they also point out that, with the contribution of an appropriate supplementary element, this answer is likely to be that more complete.

To clarify, the core element of the current study was qualitative, while its supplementary element was quantitative. It should also be noted that, because both its core and supplementary elements were examined concurrently, the current study's design was simultaneous as opposed to sequential. With these two considerations in mind, and as per the protocols of mixed-method research, the specific design of this study can be summarized as follows: QUAL + *quan*.

In commenting on this design, Morse and Niehaus (2012) pointed out that, because the qualitatively derived sample is almost certain to be purposefully selected and small, and because this is inconsistent with quantitative traditions whereby samples are expected to be randomly selected and large, the quantitative instrument utilized should have external norms if possible. This enables the results derived from the supplementary element to be compared to these normative populations, and potentially allows the researcher to make somewhat stronger claims.

Chapter 3: Method

Recognizing that elite-level success is the product of many years of extensive training and competition, this study has examined four elite Canadian curlers' career histories from the time that they first got involved in the sport to the end of the 2014-15 season. Considering this long time span, and the various activities, interactions, and experiences that might have been important along the way, this study sought to answer the following research question: *how can these curlers' histories help us to better understand the attainment and refinement of their elite-level curling expertise?* This question is largely exploratory in nature, and is intended to generate a thorough inquiry into the ongoing development of these curlers' sport-specific skills and knowledge.

Although it would have been ideal to carefully document these curlers' journeys as their careers were unfolding, this is a process that would have needed to begin more than two decades ago. Furthermore, it would have also required an accurate prediction of the particular curlers who would go on to achieve elite status without any track record in the sport. With these realities in mind, a more practical and realistic approach to answering the research question posed in this study was to employ retrospective techniques, which although potentially hindered by the realities of imperfect recall (Ward et al., 2007; and Ford et al., 2009), are still believed to have produced useful information and insight.

Participants

The participants in this study were four elite male Canadian curlers (average age-34.0), who were identified by way of purposeful sampling. According to Mayan (2009) purposeful sampling is typically employed in qualitative research, and intentionally seeks

out specific cases that are expected to provide unique insight into the topic of the inquiry. In this study, purposeful sampling was used to ensure that the participating curlers were elite by any measure. Therefore, all participants were required to have won at least one gold medal at either an Olympic Winter Games or a World Curling Championship at some point in their careers. In line with this requirement, it should be noted that a total of 25 Canadian male curlers have accomplished this feat from the 2006 Winter Olympic Games to the end of the 2014-2015 season.

Another way that purposeful sampling was used in this study was to verify that all participants were still actively competing at the highest levels of the sport, and were therefore still using their elite-level expertise. In order to ensure that this was in fact the case, another requirement was that all participants were current members of Curling Canada's National Team Program, which is a status that is currently granted to just 24 male curlers each season. With this in mind, it should be noted that 14 of the 25 Canadian men who have won a major international title since 2006 were part of this program during the 2014-15 season.

Finally, purposeful sampling also contributed to the recruitment of the specific four participants who took part of this study, especially considering that the first four curlers approached (i.e., Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen) agreed to become involved. This made it possible for the researcher to get the optimal cross-section of positional representation, meaning a curler who played each of the sport's throwing positions (i.e., Lead, Second, Third, and Fourth), and its various non-throwing positions (i.e., Skip, Vice-Skip, and two Brushers).

It should be noted that all participants consented to allow their names to be used in this study, and in any publications that might emerge from it. As per the recommendations of the University of Alberta's Research Ethics Board, this consent was verbal, and came at the outset of two separate audio-recorded interviews with each participant. For more information about this consent process, please see this study's Qualitative and Quantitative Interview Guides, which have been included in Appendices A and C respectively.

It should also be noted that, with the exception of their immediate family members, no other individuals mentioned by these curlers have been named. To this end, the names of their various teammates and coaches have been replaced with initialed terms like 'BG Teammate 1' or 'MK Coach 2'. The use of such terms protected these individuals' identities, while still allowing for reasonable continuity. With this said, the names of all other individuals, including competitors, have been replaced with more generic terms like 'Well Known Curler' or 'Former Champion'.

Mixed-Method Design

Given the exploratory nature of its research question, and the fact that a detailed answer was likely to include both qualitative and quantitative elements, this study has employed a mixed-method design. More specifically, its core element was qualitative, its supplementary element was quantitative, and both of these elements were examined simultaneously (i.e., QUAL + *quan*). To clarify, the core element of any mixed-method study should be able to answer the study's research question on its own, while its supplementary element should help to make that answer even more complete (Morse & Niehaus, 2012).

Qualitative Element

Since the core element of this study was qualitative, its theoretical drive reflects the essential elements of this type of research. According to Mayan (2009), qualitative research is primarily inductive, whereby researchers work “from individual cases (the data) and not from a pre-existing framework or a particular theory” (Mayan, 2009; p.11). With this in mind, a concerted effort was made to ensure that this study’s qualitative results were derived from the experiences and perspectives of the four elite curlers who agreed to take part.

Data Collection

Qualitative data collection in this study occurred by way of individual interviews, which were all conducted by the researcher and were all audio-recorded for the purposes of transcription. The interviews with the two local participants took place at the Saville Community Sports Centre on the University of Alberta’s South Campus, while those with the two out-of-town participants took place by way of an online video calls. The qualitative interviews conducted in this study all took place in May or June of 2015, and were all between 90 and 120 minutes in duration.

These interviews were based on the life story interview technique, which was put forward by Atkinson (1998). According to Atkinson, the life story interview is a highly versatile research tool that can be applied to many disciplinary settings, and that can meet a wide range of research needs. He describes it as an approach that “highlights the most important influences, experiences, circumstances, issues, themes, and lessons of a lifetime” (p. 7). Although life story interviews often attempt to examine multiple areas of a person’s

life (i.e., education, career, family, etc.), Atkinson points out that it is also possible to concentrate on one specific element of that life. The life story interview was therefore seen as an appropriate vehicle to gather data about the development of athletic expertise, and to do so from the standpoint of those who have already attained it.

Consistent with Atkinson's guidelines, a Qualitative Interview Guide was developed (see Appendix A). This interview guide includes questions related to a variety of personal, contextual, and process factors that could potentially impact the attainment and/or refinement of elite-level curling expertise. These factors were identified through a thorough review of academic literature on talent and athlete development (see Chapter 2), and were therefore considered to be relevant to the topic of this inquiry. With this said, the Qualitative Interview Guide was also designed to include a number of open-ended questions, and to align with what Atkinson sees as a key consideration in any life story interview: to have the participant 'hold the floor' as much as possible.

The Qualitative Interview Guide was organized around three broad career periods. Period 1 began when the curler initiated his curling involvement and ended when he completed his junior eligibility (i.e., at age-20), which also marks the end of Curling Canada's Train to Compete 2 stage (Dagg-Jackson, et al., 2008). Period 2 began at the outset of the curler's first year of men's eligibility (i.e., age-21) and ended when he won his first men's international title (i.e., Olympics or World Championship). Finally, Period 3 was began the year following this first international title, and ended at the completion of the 2014-15 season (i.e., when data collection began). It should be noted that the distinction made between Periods 2 and 3 is identical to the one made by Durand-Bush and Salmela (2002) in their study of international champions.

When each interview was complete, the audio recording was sent to a professional transcription service, which had signed a confidentiality agreement related to this study. Once the raw transcript was returned, it was checked against the original recording by the researcher and then converted into an appropriate life story document, as per Atkinson's recommended process. This process involved removing the questions themselves, deciding on where paragraphs should start and end, removing unnecessary words (including um's and uh's), adding missing ones (initially in brackets), and correcting unintended grammatical errors. Furthermore, in those cases where the answer to a question covered two or more career periods, this process also involved rearranging the order of the text with an eye to keeping chronological content together.

When the conversion was complete, the draft life story document was sent to the participant for his review. Then, once all requested changes had been made, and his final approval had been received, the qualitative data collection process for that participant was considered complete. The end product of this process, as per the traditions of life story research, was a first-person account of each curler's career, which was presented in clear, concise, and complete sentences. The curling life stories of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen can be found at www.curlinglifestories.ca.

Data Analysis

According to Atkinson (1998), it is entirely appropriate to analyze life stories from a wide range of disciplinary perspectives. In fact, it is his view that once a given a life story has been completed it becomes a secondary research document, which might then be used in any number of subsequent research projects, taking any number of different

perspectives. In this study, the life stories of the participating elite curlers were analyzed from the perspective of athletic expertise, with this analysis following an inductive protocol that was utilized by Côté (1999). This protocol was chosen because it had already been used to successfully in the sporting domain to break down qualitative data, and to then reassemble it in such a way that it provided meaningful new insight (see Chapter 2).

The Côté (1999) analytical protocol began by dividing qualitative data into homogeneous entities known as *meaning units*. These meaning units were then grouped around a smaller number *dimensions* based on their inherent commonalities. Finally, these dimensions came together into an even smaller number of *categories*, which helped to form coherent themes and provided new insight into the subject of his inquiry. The current study applied this same analytical protocol to its four curlers' life stories, and ended up generating 578 meaning units, 11 dimensions, and five categories. The step-by-step details associated with this application have been included in Appendix B, and its end product (i.e., The Five Components of Curling Expertise) has been incorporated into Chapter 4.

Enhancing Credibility

In an effort to enhance the credibility of its qualitative findings, this study employed a number of strategies suggested by Mayan (2009). The first of these strategies involved collecting and analyzing the data concurrently. The key advantage of this strategy is that it ensures that researchers are constantly engaged with their data, and that subsequent data collection efforts are shaped by that engagement. This strategy was applied to the current study by scheduling the data collection and data analysis processes with its four participants in a staggered manner. This meant that the first step in the data analysis

process (i.e., the search for meaning units) was already underway with one participant before the first step in the data collection process (i.e., the life story interview itself) began with the next participant.

Another credibility strategy suggested by Mayan (2009) was that of participant checks, which are also a key component of the life story research process. To this end, once a given interview transcript had been converted into a life story document, that document was sent to the curler in question to ensure its accuracy. It is noteworthy that this marked the end of the data collection process with each participant, and therefore was largely separate from data analysis. This aligned with Mayan's recommended timing for participant checks, and her assertion that, "early in the research process they might contribute to rigor, and later they might jeopardize it" (Mayan, 2009; p. 111).

The final credibility strategy employed in this study was researcher responsiveness, which according to Mayan (2009) helps to ensure that the results are fully supported by the data. This strategy builds on the use of an appropriate analytical protocol, by requiring the researcher to be perceptive and knowledgeable about the study's subject matter. Given that this study's researcher is an experienced coach who has worked closely with both elite and developing curlers for many years, he was well equipped to understand the various sport-specific subtleties that had been discussed by the participants, and to incorporate these subtleties into the results.

Quantitative Element

In keeping with its' particular mixed-method design (i.e., QUAL + *quan*), the qualitative element of this study was considered core, while the quantitative element was

considered supplementary. Therefore, the same small and non-randomized sample of elite male curlers that was used in the qualitative element of this study was also used in its quantitative element. Although the nature and size of this sample created limitations with respect to how the quantitative data could be used, these data still proved to be useful in enhancing the descriptive elements of this study.

Data Collection

Quantitative data collection in this study relied on a combination of archival research and personal interviews, which were both conducted by the researcher. It should be noted that the quantitative interviews were distinct from the qualitative ones, and took place at a different time. In fact, because the process associated with generating the quantitative data was seen as beneficial from the standpoint of refreshing their memories about earlier stages of their careers, the quantitative interview with was completed first with each curler, between one and eight days prior to the qualitative one. All quantitative interviews lasted between 60 and 90 minutes, and took place either at the Saville Community Sports Centre (for the two local participants) or by way of online video calls (for the two out-of-town participants).

The quantitative interviews in this study were based on a retrospective interview procedure put forward by Côté, Ericsson, and Law (2005). This procedure was chosen for two key reasons. First, its aim is to produce the most reliable retrospective information possible, and to this end its developers have noted, “any type of interview of athletes concerning their experience needs to consider not only what the researchers want to know, but also what the athletes are able to report accurately” (Côté et al., 2005; p. 16). Second,

this procedure has been used in several studies on athlete development, including Baker et al. (2003), Soberlak and Côté (2003), and Hayman et al. (2011). This was important because, as indicated by Morse and Niehaus (2012), the qualitative component of small mixed-method studies (i.e., QUAL + *quan*) can be strengthened by referencing external norms, especially if these norms have been derived from the same instrument.

The Côté et al. (2005) interview procedure includes three content areas, which have each been incorporated into a Quantitative Interview Guide (see Appendix C). Content Area One is designed to assess stable improvements in performance over time, and begins by identifying the age at which the athlete reached all relevant competitive levels. In the current study this was done in relation to five competitive milestones, which all study participants were known to have in common (i.e., first pre-men's major, first pre-men's international, first men's major, first men's international, and last recorded men's major). To clarify, Canadian curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade, while its' Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Canadian Open, National, Masters, and Players' Championship).

Although all these milestones are important for their own reasons, there is one that is particularly significant to the aims of this study. That milestone is a curler's *first men's major title*, which has been used as confirmation that elite-level expertise has in fact been attained. This is consistent with the 'senior elite success' standard put forward by Gulbin et al. (2013), and ensures that these curlers are truly elite. Consequently, all developmental

activities that came before this milestone should be seen as part of the *attainment phase*, while any that came after it should be seen as part of the *refinement phase*.

Recognizing that winning is a team accomplishment, and not solely dependent on any one player's contribution, this study also took individual shooting statistics into consideration. However, because these statistics were not taken and/or archived at most of the above-mentioned events, this study has focused exclusively on those from Curling Canada's National Championships (i.e., the Canadian Juniors and the Brier). Considering that all study participants have been regular competitors in these events, and that complete statistical records are available for each of their appearances, this approach still allowed for relevant comparisons to be made among them.

Although not included Côté and colleagues' original procedure, Hayman et al. (2011) chose to go beyond competition-related milestones and statistics by asking the athletes in their study to indicate when they first became involved with various training activities and opportunities. This approach ended up generating data that are very much in line with the aims of the current study, and it therefore made sense to follow suit. To this end, the athletes in this study were asked to identify the age when they initiated different types of training (i.e., technical, tactical, physical, and mental), and when they first became involved with certain specialized training programs (i.e., those offered by their provincial curling association, a post-secondary institution, and/or Curling Canada).

Furthermore, based on the potential contribution that diversified sporting involvement and success might make to the development of elite-level expertise in an athlete's main sport (e.g. Güllich and Emrich, 2014), the current study extended Content Area One beyond the sport of curling. More specifically, the curlers in this study were

asked to identify any other sport(s) in which they competed at the provincial level or beyond, whether in pre-adult or adult competition. Then, for every sport that met this description, they were asked to identify the age at which they reached each applicable competitive level and initiated each training activity or opportunity.

Content Area Two in the Côté et al. (2005) interview procedure is designed to gather information about the engagement in a variety of domain-related activities (i.e., within the athlete's main sport). This process typically begins by asking the athlete to list all developmental activities based from his/her perspective. However, this approach makes it very difficult to compare results between participants, and as such a modification was made in the current study. More specifically, it was decided that this study would utilize a pre-determined inventory of training and competition activities, which have been summarized and defined in Table 3.1

Table 3.1

Operational Definitions of Training and Competition Activities

Activity	Operational Definition
Technical Training	Any on-ice session involving two curlers or less, or off-ice session focused on curling technique.
Tactical Training	Any on-ice session involving three or more curlers, or off-ice session focused on game observation or analysis.
Physical Training	Any session designed to improve any aspect of a curler's fitness or athleticism.
Mental Training	Any session with a mental trainer, relevant self-study, or personal curling-related reflection.
League Competition	Recurring curling games that are typically played as part of a weekly competition.
Event Competition	Non-recurring curling games that are typically played as part of an annual competition.

Although most of the operational definitions are clear, there is one distinction that requires further explanation. That distinction is between technical and tactical training, and specifically the number of curlers allowed for in their respective on-ice practice sessions. With two or less curlers involved each is likely to be in a throwing role for at least half the time, and is therefore in a position to focus primarily on his individual technical skills (see Arnold et al., 2015). Conversely, with three or more curlers involved each is likely to be in a non-throwing role for more than half the time, and is therefore in a position to focus primarily on tactical processes (see Krepps, 2015).

With these definitions in mind, the next step in Content Area Two involved having the participant estimate the number of hours he invested in each activity in a typical week, and the number of months per year that this would have lasted. Based on this information, and factoring in any circumstances that might have kept the participant away training and/or competing for an extended period of time (e.g. major injuries), it was possible to calculate relevant aggregate hourly totals (i.e., per year, per stage, per career, etc.).

It should be noted that although the Côté et al. (2005) procedure calls for these totals to be calculated on a year-by-year basis, this study utilized carefully selected three-year stages as an alternative. Under this approach, the athlete was asked to consider all three years during a given stage, and to then imagine what a typical week might have looked like for them within that stage. Then, in order to ensure that aggregate totals could still be calculated, all three years within a stage were assigned identical values (i.e., the same hourly totals for years one, two, and three).

The rationale behind this modification is that all potential study participants have had careers that had already spanned over 20 years. With this in mind, it was felt that the

year-by-year approach suggested by Côté and colleagues would have taken an inordinate amount of the participants' time, and could have negatively impacted their motivation to participate. This was a key consideration in the current study, especially in light of the fact that only 14 athletes met the established sampling criteria, and that in order to reach the targeted sample size, over 20 percent of them would need to become and stay involved.

It should also be noted that the particular three-year stages employed in this study were chosen to align as closely as possible with the established stages of Curling Canada's LTAD framework (Dagg-Jackson et al., 2008). This was done with the recognition that this framework will continue to guide the sport's athlete development efforts well into the future, and that information about what already-elite curlers did during its various stages could prove useful to coaches and administrators alike. With this in mind, Table 3.2 summarizes the three-year stages that were used in this study, and shows their alignment with the LTAD stages identified by Curling Canada.

Table 3.2

Alignment Between Curling Canada's LTAD and the Current Study's 3-Year Stages

LTAD Stages	Curling Canada's Ages (M)	Current Study's Ages
FUNDamentals	6-9	6-8
Learn to Train	9-12	9-11
Train to Train	12-16	12-14
Train to Compete 1	16-18	15-17
Train to Compete 2	18-20	18-20
Train to Win 1	20-25	21-23
Train to Win 2	25+	24-26, etc.

Note. For more information please see Dagg-Jackson, E., Soligo, M., Balyi, I., Way, R. (2008). *Curling for life: Long-term athlete development for curling in Canada*. Ottawa, ON: Canadian Curling Association.

Finally, Content Area Three of the Côté et al. (2005) interview procedure is designed to assess a variety of factors that could limit domain-specific development. In addition to involvement in other sports, this area typically includes an assessment of the 'quality of training resources', which Côté and colleagues consider to be a compound factor that incorporates facilities, coaching, and social support. However, as important as these elements may be to any athlete's development, they are also quite challenging to quantify. Consequently, drawing on the current study's mixed-method design, these elements were addressed as part of its qualitative component as opposed to its quantitative one.

Therefore, the focus of Content Area Three in this study was exclusively on involvement in other sports, and in all cases included the same calculations that were outlined for Content Area Two (i.e., number of hours invested in a typical week, number of weeks of involvement per year, etc.). The Côté et al. interview procedure calls for each sport outside the athlete's main sport to be dealt with separately, and the current study has taken this approach for any sport where meaningful competitive success has been achieved (i.e., those where the athlete has competed at the provincial level or beyond). However, in the interest of efficiency, and consistent with the approach that was taken by Hayman et al. (2011), involvement in less competitive sports (i.e., those where the athlete did not end up reaching the provincial level) were grouped together in a single category.

Data Analysis

Given the small and non-randomized sample that has been used in this study, it was not possible to take a traditional approach to quantitative data analysis. However, because the Côté et al. (2005) interview procedure has also been used in various other studies, and

because relevant external norms are therefore available, it was still possible to use the quantitative data generated in a meaningful way (Morse & Niehaus, 2012). In fact, studies on the development of elite-level expertise in team ball sports (Baker et al., 2003), ice hockey (Soberlak and Côté, 2003), and golf (Hayman et al., 2011), which all used this interview procedure, served as important frames of reference in the current study.

More specifically, as per the guidelines of Morse and Niehaus (2012), the results from these studies allowed for relevant comparisons and enabled somewhat stronger statements to be made about the quantitative data than would otherwise have been the case. To clarify, this approach did not allow for the types of definitive statements that might have been possible from a larger, randomized sample, but it did allow the current study's quantitative data to contribute to a more complete answer to its research question.

Presentation of Results

Recognizing that this study sought to better understand the ongoing development of curling expertise through a careful examination of the careers of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen, comprehensive Career Histories were written for each of these curlers. In keeping with this study's mixed-method design, these histories contain a blend of qualitative and quantitative data, and are presented in full in Appendices D through G. A number of key similarities and differences related to the attainment and refinement of their elite-level expertise were then pulled out of these curlers' histories, and form the basis for Chapter 4.

Chapter 4: Results

This chapter examines the career histories of four still-active elite curlers (i.e. Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen), who had all won at least one gold medal over the course of their careers. Its goal is to present results that help to answer the central research question posed in this study: *how can these curlers' histories help us to better understand the attainment and refinement of their elite-level curling expertise?* In an effort to answer this question, this chapter focuses on selected aspects of these curlers' histories, and identifies a number of key similarities and differences.

This chapter begins with summary of each of these curlers' career histories, which have been included to highlight some of the unique elements of their individual journeys. The focus then moves to their competitive accomplishments, on both a team and individual level. This is followed by a detailed examination of The Five Components of Curling Expertise (i.e., technical, tactical, physical, mental, and social), and how each component has been developed over the course of these curlers' careers. Chapter 4 concludes by exploring these curlers' extensive other sport involvement, with an eye to determining whether their diverse sporting backgrounds might have contributed to their curling-related success.

Career Summaries

The first section of this chapter includes summaries of the careers of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen, which provide a synopsis of their individual journeys in the sport. As per the research protocols discussed in Chapter 3, these summaries span three distinct career periods: Start of Curling to End of Juniors,

Period 2: Start of Men's to First Men's International Title, and Period 3: After First Men's International Title to End of 2014-15 Season. For complete accounts of these curlers' career histories please see Appendices D through F.

Brad Gushue

Born on June 20, 1980 in St. John's, Newfoundland (population 104,659 in 1991), Brad Gushue grew up in the neighboring community of Mount Pearl. Although he had watched the sport regularly on television as a child, Gushue did not begin curling until age-13. He took to the sport quickly though, winning his first Newfoundland and Labrador Junior Championship the next year playing Second for an older and more experienced Skip. However, after a 1-11 record at the Canadian Junior Championship, that Skip decided to leave the team and Gushue assumed control the following season. The reconfigured team would go on to defend its provincial title, with Gushue being named the all-star Skip at the next Canadian Juniors.

Propelled by a particularly dogged work ethic, Gushue ended up winning a record six provincial titles over the course of his junior career. However, he did not break through on the national stage until his final year of eligibility at age-20. That accomplishment came on the heels of a crushing loss one year earlier in the final game of the Canadian Junior Championship, when he missed a relatively straightforward shot with this final delivery that would have secured victory. However, Gushue managed to rebound the following season, winning the Nationals and then going on to capture the 2001 World Junior Championship.

The only thing that could have made the year a success was to win the Canadian Juniors and the World Juniors. Then to pull it off, and to have the year we had, that was definitely something. I'm pretty proud of that accomplishment. (Appendix D, p. 193)

Gushue would make a smooth transition to the men's level playing regularly on the World Curling Tour from the start, and capturing his first men's major title, the 2003 Newfoundland and Labrador Men's Championship, at age-22. He would defend his provincial title the following season, and would go on to lead his young team to an impressive 8-3 round robin record at the 2004 Brier before bowing out in the playoffs. By age-24 Gushue had become a regular competitor in the prestigious Grand Slam series, and had secured a berth in the 2005 Olympic Curling Trials along with a spot in Curling Canada's National Team Program.

In the lead up to the Trials, the team added former two-time World Champion, BG Teammate 3, as their alternate and subsequently decided to insert him into the playing line-up at Skip. Gushue continued to throw fourth rocks for the team however, with his long-time teammate, BG Teammate 2 throwing third rocks, and BG Teammate 3 second rocks. The new combination clicked right away, and despite being the decided underdogs, they went on to win the Trials. Two short months later that team would reach the pinnacle of the sport when they won gold at the 2006 Olympic Winter Games in Torino, Italy. Gushue, who was age-25 at that time, offers a unique perspective this accomplishment:

The whole Olympic experience was pretty amazing. It was everything I dreamt it would be, and it still keeps me motivated. But, I don't think it changed me much as a curler. I think just my experience, and teammates, and coaches have changed me as a curler. (Appendix D, p. 200)

In the nine years that passed from Olympic triumph through the 2014-15 season, Gushue remained at the elite level of the sport, winning nine consecutive Newfoundland and Labrador Men's Championships. He has also won three Grand Slam titles (2009 Masters, 2014 National, and 2014 Canadian Open), and has managed to remain in the end-of-season top-10 on the Canadian Team Ranking System (CTRS) throughout this period. However, despite making three Brier playoff appearances, Gushue has not yet returned to the international stage and is both surprised and disappointed with that reality:

If you had told me 2006 that I'd be here now, having not won a Brier or even playing in another Trials, boy, that would have been hard to imagine...I believe we've had teams that have been good enough to win the Brier, but we just haven't done it.
(Appendix D, p. 205)

By the end of the 2014-15 season, Gushue had won a total of 25 major titles, including eight at the pre-men's level and 17 at the men's level. Naturally, these titles have been the product of a long-term investment in training and competition over the course of his career. This investment is summarized in Table 4.1, which shows that Gushue had been curling for 22 years at the time of data collection, and had accumulated a total of 23,210 curling-related hours.

Table 4.1

Brad Gushue's Curling-Related Investments by Career Period

Timeline	Years	Training Hours	Competition Hours	Curling Hours
Period 1	8	4,700	2,295	6,995
Period 2	5	4,625	1,794	6,419
Period 3	9	7,150	2,646	9,796
Career	22	15,947	6,735	23,210

Marc Kennedy

Born on February 5, 1982 in St Albert, Alberta (population 42,146 in 1991), Marc Kennedy grew up in this same community, which borders the much larger city of Edmonton. Kennedy started curling at age-6, when his father Don took over running the 'little rocks' program at the St Albert Curling Club. His older brother Glen joined him and the two would remain teammates for the next decade. Kennedy won his first Alberta Junior Championship at age-15, at Second for MK Teammate 1, with his brother at Third and their father as their coach. He would go on to win two more provincial junior titles, but would never make the playoffs at the Canadian Juniors.

With this said, Kennedy was the Skip the Alberta entry into the 1999 Canada Winter Games, where he led his team to victory at age-16. Then, at age-20 he was added as the alternate Canada's 2003 Winter Universiade roster, which was skipped by MK Teammate 3. However, the team struggled in their first few games, and Kennedy was inserted into the line-up partway through the round robin at Third. From that point forward Team Canada would not lose another game, and ended up earning Universiade gold:

Things just clicked right away. By the end of that event, there just wasn't anybody that was going to beat us. (Appendix E, p. 219)

Kennedy's transition to men's competition was an extremely quick and successful one in part because he was recruited to play Second for former two-time World Junior Champion, MK Teammate 4. In fact, the team wasted no time in winning the 2004 Players' Championship, when Kennedy was just age-21, and then went on to finish third at the 2005 Olympic Trials. However, Kennedy and MK Teammate 4 had a thirst for more, and joined

forces with then two-time Olympian Skip, MK Teammate 5, to form what would become one of the most dominant teams in curling history. A solid first season together put him into Curling Canada's National Team Program for the first time, but the new team was only getting started. In fact, they would go on to win the 2008 World Men's Championship, and Kennedy, who was then age-25, came away duly impressed with his veteran Skip:

One thing I remember [MK Teammate 5] telling us is "It's a World Championship, and it's a big stage, and there's lots of people, but it's still just the game of curling." And, he had a way of portraying that on the ice. I found a lot of calm and peace of mind in that. (Appendix E, p. 227)

The following season the team would manage to defend their Alberta and Canadian titles, before being defeated by Scotland in an epic final at the 2009 World Men's Championship. However, the best was yet to come as Kennedy and his teammates would go on to capture the 2009 Olympic Trials before winning gold at the 2010 Olympic Winter Games in Vancouver. However, despite reaching the pinnacle of the sport, Kennedy's comments about this accomplishment suggest that he clearly had mixed emotions:

I look back at the experience, and although it was wonderful and it was amazing, and I was so happy to be a part of such a great team, on a personal level, I still wasn't the curler I wanted to be. (Appendix E, p. 233)

The team continued to be quite successful over next quadrennial, racking up several more major titles and never finishing lower than sixth on CTRS. However, at the end of the 2013-14 season, after capturing the Players' Championship, MK Teammate 5 retired from the sport. Kennedy then formed a new team with former World Champion, MK Teammate 8 at the helm, and moved up to the Third position for the first time since his junior days.

The new team had a solid first season together, winning the 2015 Alberta Men's Championship, but has its' sights set on winning many more titles in the years to come.

By the end of the 2014-15 season, Kennedy had won a total of 29 major titles, including five at the pre-men's level and 25 at the men's level. Naturally, these titles have been the product of a long-term investment in training and competition over the course of his career. This investment is summarized in Table 4.2, which shows that Kennedy had been curling for 27 years at the time of data collection, and had accumulated a total of 17,659 curling-related hours.

Table 4.2

Marc Kennedy's Curling-Related Investments by Career Period

Timeline	Years	Training Hours	Competition Hours	Curling Hours
Period 1	15	3,654	1,770	5,424
Period 2	5	3,451	1,281	4,732
Period 3	7	5,571	1,932	7,503
Career	27	12,676	4,983	17,659

Brent Laing

Born on December 10, 1978 in the small town of Meaford, Ontario (population 4,520 in 1991), Brent Laing remained there until age-15, when he moved to nearby Stayner, Ontario. Laing began curling at age-9 as part of his elementary school's physical education program, and by age-12 was playing regularly in the Meaford Curling Club's various adult leagues. Laing made it to his first Ontario Junior Championship at age-15, but it was not until age-19, as the Lead for future Olympic champion BL Teammate 3, that he would reach the national level. It turned out to be well worth the wait, however, as Laing

and his teammates captured the 1998 Canadian and World Junior Championships and then went on to defend both titles the following season. Although proud of both seasons, Laing has particularly vivid memories about 1998:

Jumping around like crazy kids, I'll never forget that. The World Juniors in Thunder Bay, the first time wearing the Canadian colors, and at the time feeling like a million people were watching. (Appendix F, p. 246)

Laing remained with BL Teammate 3 for the first three years of his men's career, and at age-23 won his first Ontario Men's Championship, making it all the way to the 2002 Brier final. On the strength of that season he was included in Curling Canada's National Team Program for the first time, and then went on to compete in the 2002 Olympic Trials. However, in the summer of 2003 BL Teammate 3 decided to move to Alberta, which led to a transitional season for Laing. After that season he and BL Teammate 2 forces with former two-time World Champion BL Teammate 5 and former Olympic silver medalist BL Teammate 6, with Laing moving to the Second position. After losing the final in their initial year together, the team won their first of eight consecutive Ontario Men's titles in 2006, but then lost the Brier final. However, they made up for it the following season, winning the 2007 Brier and World Championship when Laing was age-28:

It was just like those kids jumping around in '98 winning their first Canadians. Winning your first Brier is just unreal. Then we got to wear the Canadian Maple Leaf again, and we got to go to Edmonton for another home Worlds. That's the best week we probably ever had as a team. (Appendix F, p. 252)

The team would retain the same line-up for four more seasons, finishing second in the 2009 Olympic Trials, and adding 10 more major titles to its list of accomplishments.

However, at the end of the 2010-11 season BL Teammate 6 decided to step away from the sport, and was replaced with then two-time World Champion BL Teammate 7. The newly configured team had an outstanding debut season, winning the 2012 Brier and World Championships when Laing was age-33:

When you don't win the Brier its like 'We lost to a Canadian team'. There so many great teams in Canada, and it's such a hard event to win. But, when you go to the Worlds you are Canada. You're the only ones that have the chance to win or lose for Canada that year. There's so much pressure that comes with that. (Appendix F, p. 258)

At the end of the 2013-14 season, after 10 highly successful seasons during which they never finished lower than fourth on CTRS, Laing made the difficult decision to leave his team to join an all-star line-up that included Marc Kennedy and BL Teammates 8 and 9. The new team, which was put together with the goal of winning gold at the 2018 Olympic Winter Games, had a successful but not spectacular first season together. However, they did manage to win the 2015 Alberta Men's Championship, Laing's first outside of his native Ontario, and seemed poised for greater success in the years to come.

By the end of the 2014-15 season, Laing had won a total of 33 major titles, including six at the pre-men's level and 27 at the men's level. Naturally, these titles have been the product of a long-term investment in training and competition over the course of his career. This investment is summarized in Table 4.3, which shows that Laing had been curling for 28 years at the time of data collection, and had accumulated a total of 19,440 curling-related hours.

Table 4.3

Brent Laing's Curling-Related Investments by Career Period

Timeline	Years	Training Hours	Competition Hours	Curling Hours
Period 1	12	3,378	2,325	5,703
Period 2	8	4,184	2,286	6,470
Period 3	8	4,915	2,352	7,267
Career	28	12,477	6,963	19,440

Nolan Thiessen

Born on November 6, 1980 in tiny Pilot Mound, Manitoba, Nolan Thiessen moved to Brandon, Manitoba (population 38,567 in 1991) at age-5, and grew up there. Thiessen began curling at age-11, but it was by no means his main sport. Instead, he was an avid baseball pitcher, and actually moved to the United States at age-18 to pursue that sport. He spent two years south of the border, playing at both the high school and college levels, before returning to Canada and the sport of curling.

Despite his absence, Thiessen still got the opportunity to play Lead for the up and coming NT Teammate 1, and ended up advancing all the way to the 2001 Canadian Junior final before losing to Newfoundland and Labrador's Brad Gushue. He went on to with NT Teammate 1 again in 2003, after being added to the Brandon University Bobcats team that won the 2002 Canadian University Nationals. That gave him the opportunity to represent Canada at the 2003 Winter Universiade where he and his new teammates won gold. Thiessen was ecstatic about that accomplishment and it seemed to whet his appetite for future Team Canada experiences:

Universiade turned out to be a big thing for me. It was that national pride, and wanting to do that again. (Appendix G, p. 280)

However, it would be seven more years before Thiessen's next opportunity to wear the maple leaf, and his journey to get there was not without its complications. In fact, after toiling in relative obscurity on the Manitoba tour for two more years, he accepted an offer to play for Edmonton-based Skip NT Teammate 3. After making it to the final game of the 2006 Alberta Men's Championship, Thiessen left NT Teammate 3 to join forces with NT Teammates 4, 5, and 6. With this new line-up, Thiessen would advance to the 2007 Alberta Men's final, before again finishing second.

However, based on that finish, and on his new team's strong play in other major events, Thiessen would be included in Curling Canada's National Team Program for the first time at age-26. He would then win his first men's major title the following season, when he and his teammates captured the 2008 Canada Cup. From there the team posted a winning record at the 2009 Olympic Trials, and won Thiessen's first Alberta Men's championship a couple of months later. The team then went on to win the 2010 Brier and World Championship, which not surprisingly was a particularly proud day for Thiessen, who at that time was age-29:

We wanted to win for each other so badly, as much as we wanted to win for ourselves. It was just like we were so proud to win it with each other, to stand on the podium, to sing the national anthem. That was just the best! (Appendix G, p. 284)

The five seasons that have followed the 2010 World Championship have seen several major line-up changes, including the departure of NT Teammate 6 after the 2010-11 season and NT Teammate 4 after the 2013-14 season. However, despite these changes, and the turmoil that has surrounded them, he and his remaining teammates never fell out

of the top-10 on CTRS. Even more significantly, the back-to-back Brier titles that Thiessen won in 2014 and 2015 is a rare feat for any curler, and one in which that he takes great pride. However, at age-34, he is clearly taking it one step at a time:

I'm at the point now too where I don't care about the legacy of it anymore. I don't need to win to say I've reached some point. I'd love to go and win the Olympics. But, I also know that the Trials are probably the biggest crapshoot in curling. There are so many good teams and everyone wants it so badly. (Appendix G, p. 296)

By the end of the 2014-15 season, Thiessen had won a total of 13 major titles, including three at the pre-men's level and 10 at the men's level. Naturally, these titles have been the product of a long-term investment in training and competition over the course of his career. This investment is summarized in Table 4.4, which shows that Thiessen had been curling for 22 years at the time of data collection, and had accumulated a total of 16,959 curling-related hours.

Table 4.4

Nolan Thiessen's Curling-Related Investments by Career Period

Timeline	Years	Training Hours	Competition Hours	Curling Hours
Period 1	8	2,280	1,050	3,330
Period 2	9	5,493	2,418	7,911
Period 3	5	4,395	1,323	5,718
Career	22	12,168	4,791	16,959

Performance Metrics and Competitive Milestones

In keeping with the research protocols discussed in Chapter 3, the strongest evidence of athletic expertise comes from individual performance measures, which in curling typically revolves around a player's shooting accuracy. Although not available for

every major event, shooting accuracy statistics have been recorded at all Curling Canada National Championships over the past three decades. To this end, Table 4.5 summarizes these curlers' average positional rankings at the various Canadian Juniors and Briers in which they have competed.

Table 4.5

A Comparison of Appearances and Average Positional Ranking in Curling Canada Nationals

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Event	#	Rank	#	Rank	#	Rank	#	Rank	#	Rank
Juniors	6	3.7	3	2.7	2	1.0	1	3.0	3.0	2.6
Brier	12	3.1	6	1.3	10	2.5	4	3.0	8.0	2.5
Career	18	3.3	9	1.8	12	2.3	5	3.0	11.0	2.6

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

This table shows that these curlers had average positional rankings of 2.6 (range 1.0 to 3.7) in their Canadian Juniors appearances and 2.5 (range 1.3 to 3.1) in their Brier appearances. To put these rankings into perspective, there are 14 curlers at each position at a Canadian Juniors and 12 curlers at each position at a Brier. Therefore, the recorded individual performances of the four curlers in this study were clearly in the upper echelon of both fields. However, it is important to recognize that these National Championships represent just one of the many events on their schedules each season, and as such there is a need to look towards other ways of confirming their expertise.

To this end, Tables 4.6 and 4.7 summarize the pre-men's and men's major titles that these curlers' teams have captured over the course of their careers. As indicated, on average they won 5.3 pre-men's major titles (range 2.0 to 8.0), and 19.0 men's major titles (range 10.0 to 27.0). Taken together, these are clear indicators that they have all been

quite successful at for many years. In fact, it is also noteworthy that they all managed to win major international titles at *both* the pre-men's (i.e., World Juniors or World Universiade) and men's levels (i.e., World Men's or Olympics).

Table 4.6

A Comparison of Pre-Men's Major Titles

Event	Gushue	Kennedy	Laing	Thiessen	Average
Provincial Juniors	6	3	2	1	3.0
Canadian Juniors	1	0	2	0	0.8
World Juniors	1	0	2	0	0.8
Canada Games	0	1	0	0	0.3
University Nationals	0	0	0	1	0.3
World Universiade	0	1	0	1	0.5
Total	8	5	6	3	5.5

Table 4.7

A Comparison of Men's Major Titles

Event	Gushue	Kennedy	Laing	Thiessen	Average
Provincial Men's	12	6	10	3	7.8
Brier	0	2	2	3	1.8
World Men's	0	1	2	1	1.0
Olympic Trials	1	1	0	0	0.5
Olympics	1	1	0	0	0.5
Canada Cup	0	2	1	1	1.0
Grand Slams	3	11	12	2	7.0
Total	15	24	27	10	19.0

These curlers' impressive results make it possible to examine their careers by way of five competitive milestones (i.e., first pre-men's men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded

men's major title). These five milestones form the basis of Table 4.8, which summarizes these curlers' ages and years of experience in relation to each. To this end, it is noteworthy that on average they won their first pre-men's major titles at age-17, with just 7.8 years of curling experience, and that their last recorded men's major title came at age 34.0, with 24.8 years of curling experience. This means that these curlers had been highly successful in the sport for a period of 17.0 years through to the time of data collection (i.e., the end of the 2014-15 season). For detailed data related to these curlers' cumulative training and competition investments at each of these milestones, please see Appendices D-G.

Table 4.8

A Comparison of Ages and Years of Curling Experience by Competitive Milestone

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Milestone	Ages	Years	Ages	Years	Ages	Years	Ages	Years	Ages	Years
1 st Pre-Men's Major	14	2.0	15	10.0	19	11.0	20	8.0	17.0	7.8
1 st Pre-Men's International	20	8.0	20	15.0	19	11.0	22	10.0	20.3	11.0
1 st Men's Major	22	10.0	21	16.0	23	15.0	27	15.0	23.3	14.0
1 st Men's International	25	13.0	25	20.0	27	19.0	29	17.0	26.5	17.3
Last Men's Major	34	22.0	32	27.0	36	28.0	34	22.0	34.0	24.8

Note. All ages are as of January 1st, which was Curling Canada's established eligibility date from the 2000-01 season through the 2014-15 season. However, Years Invested was calculated as of the end of each curling season (i.e., approximately April 15th).

Curling Training and Competition Investments

Although all the competitive milestones just examined are significant for their own reasons, there is one that is particularly significant to the aims of the current study. That milestone is these curlers' *first men's major title*, which has been used as confirmation that

they had attained elite-level curling expertise. With this in mind, all investments made up to and including that season should be seen as part of the *attainment phase*, while those made after that point should be seen as part of the *refinement phase*. Tables 4.9 and 4.10 align with this distinction by summarizing these curlers' overall curling investments during both of these phases.

Table 4.9

A Comparison of Years and Hours in Curling Overall: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	10	9,649	16	6,289	15	8,082	15	9,023	14.0	8,260.8
Refinement	12	13,568	11	11,370	13	11,358	7	7,636	10.8	11,056.2
Career	22	23,210	27	17,659	28	19,440	22	16,959	24.8	19,317.0

Table 4.10

A Comparison of Annual Hours in Curling Overall: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	964.9	393.1	538.8	601.5	590.1
Refinement	1,130.7	1,033.6	873.7	1,090.9	1,023.7
Career	1,055.0	654.0	694.3	770.9	778.9

Based on these tables, it is clear that these curlers invested an average of 14.0 years (range 10.0 to 15.0) and 8,260 total hours (range 6,289.0 to 9,023.0) in curling when they were attaining their elite-level expertise, for an average of 590.1 annual hours (range 393.2 to 964.9). By comparison, they invested an average 10.8 years (range 7.0 to 13.0) and 11,056.2 total hours (range 7,636.0 to 13,568.0) in curling as they were refining this expertise, for an average of 1,023.7 annual hours (range 873.7 to 1,130.7). Recognizing that the ranges among them got somewhat smaller as their careers progressed, the key

finding here is that these curlers invested considerably more on an annual basis to remain at the elite level of their sport than they did to get there.

Tables 4.11 and 4.12 summarize these curlers' training investments during the attainment vs. refinement phases. It should be noted that they invested an average of 14.0 years (range 10.0 to 16.0) and 5,485 total hours (range 4,288.0 to 6,550.0) in training as they were attaining their expertise, for an average of 391.8 annual hours (range 268.0 to 655.0). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 7,964.0 total hours (range 6,067.0 to 9,925.0) in training as they were refining it, for an average of 737.4 annual hours (range 575.1 to 899.7). Recognizing that the ranges among them got somewhat smaller as their careers progressed, the key finding here is that these curlers trained considerably more to remain at the elite level than they did to get there.

Table 4.11

A Comparison of Years and Hours in Curling Training: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	10	6,550	16	4,288	15	5,001	15	6,101	14.0	5,485.0
Refinement	12	9,925	11	8,388	13	7,476	7	6,067	10.8	7,964.0
Career	22	16,475	27	12,676	28	12,477	22	12,168	24.8	13,449.0

Table 4.12

A Comparison of Annual Hours in Curling Training: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	655.0	268.0	333.4	406.7	391.8
Refinement	827.1	762.6	575.1	899.7	737.4
Career	748.9	469.5	445.6	553.1	542.3

Tables 4.13 and 4.14 summarize these curlers' competition investments during the attainment vs. refinement phases. It should be noted that they invested an average of 12.5 years (range 10.0 to 15.0) and 2,775.8 total hours (range 2,001.0 to 3,099.0) in competition as they were attaining their expertise, for an average of 222.1 annual hours (range 153.9 to 309.9). By comparison, they invested an average of 10.8 years (range 8.0 to 13.0) and 3,092.2 total hours (range 1,869.0 to 3,882.0) as they were refining it, for an average of 286.3 annual hours (range 267.0 to 303.0). Recognizing that the ranges among them got smaller as their careers progressed, the key finding here is that these curlers competed more to remain at the elite level than they did to get there.

Table 4.13

A Comparison of Years and Hours in Curling Competition: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	10	3,099	13	2,001	12	3,081	15	2,922	12.5	2,775.8
Refinement	12	3,636	11	2,982	13	3,882	7	1,869	10.8	3,092.2
Career	22	6,735	24	4,983	25	6,963	22	4,791	23.3	5,868.0

Table 4.14

A Comparison of Annual Hours in Curling Competition: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	309.9	153.9	256.8	194.8	222.1
Refinement	303.0	271.1	298.6	267.0	286.3
Career	306.2	207.6	278.5	217.8	254.8

Table 4.15 summarizes the training to competition ratios that these curlers employed during the attainment vs. refinement phases. To this end, it should be noted that

they had a 67:33 training to competition ratio (range 62:38 to 68:32) when they were attaining their expertise as compared to a 72:28 ratio (range 66:34 to 82:18) when they were refining it. These ratios suggest that they relied more heavily on training during the refinement phase than the attainment phase. Moreover, Table 4.16, which incorporates the same three-year stages that guided this study's quantitative data collection process, demonstrates that these curlers' training commitments were at their lowest in their early to mid teens, and at their highest in their thirties.

Table 4.15

A Comparison of Curling Training to Competition Ratios: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	68:32	68:32	62:38	68:32	67:33
Refinement	73:27	74:26	66:34	82:18	72:28
Career	71:29	72:28	64:36	72:28	70:30

Table 4.16

A Comparison of Training to Competition Ratios in 3-Year Stages

Ages	Gushue	Kennedy	Laing	Thiessen	Average
6-8	N/A	100:0	N/A	N/A	100:0
9-11	N/A	50:50	100:0	100:0	83:17
12-14	31:69	51:49	55:45	43:57	45:55
15-17	69:31	60:40	48:52	57:43	59:41
18-20	72:28	78:22	68:32	84:16	76:24
21-23	71:29	73:27	68:32	63:37	69:31
24-26	76:24	73:27	62:38	67:33	70:30
27-29	70:30	75:25	64:36	75:25	71:29
30-32	73:27	74:26	62:38	76:24	71:29
33-35	75:25	N/A	71:29	78:22	75:25
36-38	N/A	N/A	73:27	N/A	73:27
Career	71:29	72:28	64:36	72:28	70:30

The Five Components of Curling Expertise

This study identified five distinct components of these curlers' expertise. Four of these components (i.e., technical, tactical, physical, and mental) were expected, since questions related to each were included in the Quantitative Interview Guide (see Appendix A). With this said, the fifth component (i.e., social) emerged entirely from this study's Qualitative Data Analysis Process (see Appendix B). This section shows how each of The Five Components of Curling Expertise has evolved over the course of these curlers' careers.

1. Technical Component

This section focuses on the most relevant elements of these athletes' histories related to the attainment and refinement of the technical component of their curling expertise. In keeping with the inclusion criteria laid out in Appendix B, this *technical component is considered to include a curler's delivery, shot-making, and personal sweeping capabilities*. Furthermore, this study has defined *technical training as any on-ice practice session involving two curlers or less, or any off-ice session focused on curling technique*.

With these definitions in mind, this section describes the ongoing development of the technical component of these curlers' elite-level expertise. It includes common technical themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' technical training investments, which are summarized in Tables 4.17 through 4.20.

Table 4.17

A Comparison of Years and Hours Invested in Technical Training by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	8	1,700	15	702	12	771	8	450	10.8	905.8
Period 2	5	1,015	5	612	8	748	9	237	6.7	835.3
Period 3	9	1,692	7	1,005	8	385	5	312	7.3	848.5
Career	22	4,407	27	2,319	28	1,904	22	999	24.8	2,407.3

Table 4.18

A Comparison of Annual Hours Invested in Technical Training by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	212.5	46.8	64.3	56.3	83.9
Period 2	203.0	122.4	93.5	23.7	124.7
Period 3	188.0	143.6	48.1	62.4	116.2
Career	200.3	85.9	68.0	45.4	97.1

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.17 and 4.18 these curlers invested an average of 10.8 years (range 8.0 to 15.0) and 905.8 total hours (range 450.0 to 1,700.0) in technical training in this period, for an average of 83.9 annual hours (range 46.8 to 212.5). It should be noted that this annual average is somewhat lower than their career average of 97.1 annual hours. Furthermore, the substantial range that existed among them on Period 1 annual hours suggests that these curlers' typical technical training investments were initially quite different from one another.

From a qualitative perspective, a total of 22 meaning units related to the Technical Expertise category emerged from these curlers' Period 1 histories. Of these meaning units,

eight were found to contribute to a common theme that is relevant to all four curlers' experiences, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers relied on a junior coach to help them with their technical development.*

In Brad Gushue's case that coach was BG Coach 1, who appears to have been quite knowledgeable from a technical standpoint. It also appears that BG Coach 1 used this knowledge to carefully analyze Gushue's curling delivery, and that of BG Teammate 2, during their junior years:

[BG Coach 1] played a large part in that because he is so good technically, and has a pretty keen eye for stuff like that. He knows my delivery, and [BG Teammate 2's] delivery, so well. (Appendix D, p. 195)

Brent Laing also seems to have had a capable technical coach in BL Coach 1, who was actually with him from the first day that he started curling. With this in mind, and recognizing that he served as his junior coach for several years after that, BL Coach 1 seems to have been instrumental in solidifying Laing's technical fundamentals:

He was up to date on the coaching things with Curl Ontario. He was a pretty good technical coach, so by that time, not to say that I had everything mastered, but it was pretty permanent. (Appendix F, p. 248)

Unlike Laing, Nolan Thiessen was largely on his own technically for most of his junior career, but that situation changed when he was age-20. That was when he began working with NT Coach 1, who seems to have provided Thiessen with some technical structure that had not had previously:

He was a great reader of the technical delivery, and he could help me out quite a bit. He was my first coach that actually had structured curling practices, which I had not really ever had. (Appendix G, p. 277)

Marc Kennedy's father Don was his first curling coach, and the only one he had throughout junior career. However, it appears that the elder Kennedy's technical understanding was somewhat limited, and that the younger Kennedy's initial technical development might have been hindered as a result:

In hindsight, it was a great thing to have my dad around, but in some of those development years, some more technical expertise definitely would have made a big difference. I ended up with certain technical deficiencies that I still have to this day because of it. (Appendix E, p. 221)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.17 and 4.18, these curlers invested an average of 6.7 years (range 5.0 to 9.0) and 835.8 total hours (range 237.0 to 1,015.0) in technical training during Period 2, for an average of 124.7 annual hours (range 23.7 to 203.0). It should be noted that this annual average is considerably higher than the 83.9 annual hours that they recorded in Period 1. Furthermore, the substantial range that existed among them on Period 2 annual hours suggests that these curlers' typical technical training investments continued to be quite different from one another.

From a qualitative perspective, a total of 20 meaning units related to the Technical Expertise category emerged from these curlers' Period 2 histories. Of these meaning units, 13 were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of

this component of their curling expertise. This common theme is as follows: *all curlers had access to a knowledgeable teammate as a technical practice partner.*

Marc Kennedy's practice partner was his Olympic and World Championship Skip, MK Teammate 5, who is widely considered to be one of the most successful curlers in the history of the sport. It appears that the time they spent together helped to correct the technical deficiencies that Kennedy felt he had developed during the previous period:

For [MK Teammate 5] and I, it was a matter of finding similar release points, similar lines of delivery, and similar paths of our rocks. I was a strong hitter, but he said, "Let's get you better at draws." So, we spent a lot of time on draws, while at the same time doing our technical work. (Appendix E, p. 230)

Brent Laing had a similar opportunity in being able to practice with his World Championship Skip, BL Teammate 5. However, the fact that the two lived quite a distance apart, combined with Laing's comfort level in practicing on his own, meant that he did not access BL Teammate 5 as frequently as might otherwise have been the case:

In terms of practicing I would generally try to get down to the club on my own about three times a week. Then, if I wanted some technical help I would ask BL Teammate 5 to come out with me, but honestly that didn't happen a whole bunch. (Appendix F, p. 255)

Nolan Thiessen actually had two teammates who he practiced with, BL Teammates 5 and 6, and the three made a point of doing so as much as possible. However, it appears that Thiessen tended to rely on BL Teammate 5, who was already an Olympic medalist, as his primary source of technical expertise:

The three of us also threw a lot at each other's brooms, getting guys' opinions on how you were throwing them. [NT Teammate 5] really helped me improve that way. He was like, "You're bringing it to this toe, or you're squaring it in that spot." Just something like that. (Appendix G, pp. 284-285)

Interestingly, Brad Gushue's practice partner, BG Teammate 2, had a very similar technical understanding to his own. However, the fact that the two had learned that aspect of the game together during the previous period, and were willing to practice frequently even during their university class time, is what made their partnership work so well:

To be quite honest, I barely went to any classes. [BG Teammate 5] and I we used to try to get in a lot of same classes the first couple years, and we'd just usually ditch them and go down to the curling club to throw some rocks. (Appendix D, p. 203)

Period 3: After First International Men's Title to End of 2014-15 Season

As indicated in tables 4.17 and 4.18 these curlers invested an average of 7.3 years (ranges 5.0 to 9.0) and 848.5 total hours (range 312.0 to 1,692.0) in technical training in this period, and 116.2 annual hours (range 48.1 to 188.0). It should be noted that this annual average is very similar to the 119.4 annual hours that they recorded in Period 2. Furthermore, the substantial range that existed among them on Period 3 annual hours suggests that these curlers' typical technical training investments were still quite different from one another.

From a qualitative perspective, a total of 18 meaning units related to the Technical Expertise category emerged from these curlers Period 3 histories. Of these meaning units, 9 were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that offers insight into the evolution of this component

of their curling expertise. This common theme is as follows: *all curlers adjusted the nature of their technical training in order to further enhance their skills.*

Nolan Thiessen has adjusted his approach considerably during Period 3, with a greater emphasis on individual practice and on building his own position-specific skills. It appears that this adjustment was triggered by his teammates busy schedules, but Thiessen has used this situation to work on his own technical competencies:

I'm starting to get more structure in my practices now. Sometimes, I need to practice on my own to just work on Lead things. Instead of throwing all 16 rocks down and all 16 rocks back, I'll throw 4 down and just throw all the Lead's rocks. Really trying to concentrate on my position. (Appendix G, p. 291)

Brent Laing's technical training adjustments have also been a product of life circumstances, but in his case these circumstances have given him a more regular practice partner in his new wife, an accomplished international champion herself. According to Laing, has driven him to practice harder and more effectively, and to adopt new routines:

I've practiced on my own for so long. Not that we're always in the same place at the same time, but practice-wise she pushes me. She certainly has had better practice habits than I've had traditionally. I've now adopted those, and we have a great routine we go through. (Appendix F, p. 262)

Brad Gushue's adjustment was due to the fact that he has taken on a mentorship role with his younger teammates in recent years, and as such his technical practices now tend to involve his full line-up. This reality has led to a new format for these practices, and may have enhanced the efficiency of Gushue's own technical development:

Our practice habits have probably improved a little bit too, and I hope they're going to improve even more with some of the changes we're trying to implement. It's probably not as much volume as in the past, but from a time standpoint, it's the same. But, our practices are still mostly technical in nature. (Appendix D, p. 209)

Although Marc Kennedy continued to practice with his Olympic and World Championship Skip, MK Teammate 5 for most of this period, he became very focused on getting the most out of those practices. To this end, he clearly wanted to work on certain technical elements that he saw as being deficiencies:

I wanted to use these three years to learn more from [him]. And, to work on my draw weight, and on my out-turn. The things that I thought were weaknesses. Basically, to use these three 'grace-period' years to improve. (Appendix E, p. 236)

This section has described the ongoing development of the technical component of these curlers' expertise in relation to the three career periods that have formed the basis of this study's core qualitative element. However, before moving on it is also important to examine the quantitative data surrounding their technical training investments from a somewhat different perspective. More specifically, Tables 4.19 and 4.20 present these data in the same manner that these curlers' general training and competition investments were presented earlier in this chapter (i.e., in relation to attainment vs. refinement phases).

Table 4.19

A Comparison of Years and Hours in Technical Training: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	10	2,126	16	806	15	1,068	15	639	14.0	1,159.8
Refinement	12	2,281	11	1,513	13	836	7	360	10.8	1,247.5
Career	22	4,407	27	2,319	28	1,904	22	999	24.8	2,407.3

Table 4.20

A Comparison of Annual Hours in Technical Training: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	212.6	50.4	71.2	42.6	82.8
Refinement	190.1	137.5	64.3	51.4	115.5
Career	200.3	85.9	68.0	45.4	97.1

In examining these tables it should be noted that curlers invested an average of 14.0 years (range 10.0 to 16.0) and 1,159.8 total hours (range 639 to 2,126) in technical training as they were attaining this expertise, for an average of 82.8 annual hours (range 42.6 to 212.6). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 1,247.5 total hours (range 360.0 to 2,281.0) in refining it, for an average of 115.5 annual hours (range 45.4 to 190.1). Without discounting the ranges that existed among them during both phases, the key finding here is that no pattern is apparent in these curlers' annual technical training investments before vs. after reaching the elite level of the sport.

2. Tactical Component

This section focuses on the most relevant elements of these athletes' histories related to the attainment and refinement of the tactical component of their curling expertise. In keeping with the inclusion criteria laid out in Appendix B, this *tactical component is considered to include a curler's pre-shot and in-shot decision-making capabilities*. Furthermore, this study has defined *tactical training as any on-ice session involving three or more curlers, or off-ice session focused on game observation or analysis*.

With these definitions in mind, this section describes the ongoing development of the tactical component of these curlers' elite-level expertise. It includes common tactical

themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' tactical training investments, which are summarized in Tables 4.21 through 4.24.

Table 4.21

A Comparison of Years and Hours Invested in Tactical Training by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	6	810	9	500	9	777	5	85	7.3	543.0
Period 2	5	960	5	679	8	746	9	954	6.7	834.8
Period 3	9	1,428	7	1,254	8	1,365	5	698	7.3	1,186.2
Career	20	3,198	21	2,433	25	2,888	19	1,737	21.3	2,564.0

Table 4.22

A Comparison of Annual Hours Invested in Tactical Training by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	135.0	55.6	86.3	21.3	77.6
Period 2	192.0	135.8	93.3	95.4	124.6
Period 3	158.7	179.1	170.6	139.6	162.5
Career	159.9	115.9	115.5	91.4	120.4

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.21 and 4.22 these curlers invested an average of 7.0 years (range 4.0 to 9.0) and 543.0 total hours (range 85.0 to 810.0) in tactical training in this period, for an average of 77.6 annual hours (range 21.3 to 135.5). It should be noted that this annual average is considerably lower than their career average of 115.7 annual hours. Furthermore, the substantial range that existed among them on Period 1 annual hours

suggests that these curlers' typical tactical training investments were initially quite different from one another.

From a qualitative perspective, a total of 21 meaning units related to the Tactical Expertise category emerged from these curlers Period 1 histories. Of these meaning units, 11 were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development into this component of their curling expertise. This common theme is as follows: *all curlers improved their tactical understanding by watching curling games involving elite competitors.*

Much of Nolan Thiessen's early tactical learning came when his hometown hosted the 1995 World Championships, giving him the opportunity to study the Canadian men's team, up close. According to Thiessen, this experience gave him an initial understanding of an elite team's overall tactical approach:

I pretty much took a week off school, and just spent the entire week at Keystone Centre watching the Worlds. I was just such a huge [Canadian Skip] fan, really his entire team. I started to pay attention to how they operated out there. (Appendix G, p. 277)

In Brad Gushue's case, his initial tactical learning came from watching curling on television, and paying attention to how the top Skips of the day handled their shot selection decisions. According to Gushue, this viewing led him to carefully consider his own tactical decisions, and later to ask questions of some of the top Skips from his province:

When I wasn't playing, I watched a lot. Watching guys on TV, back in the early '90's, guys like [list of Champion Skips], and all those guys. That's kind of how I learned the basic strategy. (Appendix D, p. 196)

Similarly, Marc Kennedy also used televised curling as a vehicle to enhance the tactical understanding that he and his brother had initially gained through game play. In fact, their habit of recording games, and then reviewing certain situations, allowed him to analyze the experts' shot-selection decisions, and ultimately informed his own thinking:

Later on, we watched a ton of games on TV. Having the chance to re-wind and re-watch to see what guys did differently, or what mistakes they made that you might have done differently...That became the foundation for those tactical decisions.
(Appendix E, pp. 222-223)

Brent Laing's early tactical development was particularly interesting. Although he also did a good portion of his initial learning by watching televised curling, he then singled out a home province championship team that he admired and applied that team's tactical approach to his own situation:

Most of what I've learned about curling has been through experience, and when I was young, watching on TV. Watching the [Ontario Team]. We were always aggressive, and took some heat from our parents about being too aggressive. But, that's the way we saw it played on TV, and that's the way we wanted to play.
(Appendix F, p. 249)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.21 and 4.22 these curlers invested an average of 6.7 years (range 5.0 to 9.0) and 834.8 total hours (range 679.0 to 960.0) in tactical training in this period, for an average of 117.3 annual hours (range 93.3 to 192.0). It should be noted that this annual average is considerably higher than the 77.6 annual hours that they recorded in Period 1. Furthermore, the considerable range that existed among them on Period 2

annual hours suggests that these curlers' typical tactical training investments were still noticeably different from one another.

From a qualitative perspective, a total of 22 meaning units related to the Tactical Expertise category emerged from these curlers Period 2 histories. Of these meaning units, nine were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers experienced most of their tactical development in and around the competition environment.*

For Brad Gushue this learning came from playing against some of the best and most experienced Skips in the game on the World Curling Tour, and then holding his own tactical decisions up against theirs'. As a result of this process, it appears that Gushue came to the conclusion that shot tolerance was his team's greatest shortcoming at that time:

We had to get out and play the [list of Champion Skips] of the world, and take our lumps against them...You play a pretty good game, but you still find a way to lose by a couple points. When you start analyzing the game, it's in how you miss certain shots, and sometimes how you make them. (Appendix D, p. 199)

Rather than using his opponents as a frame of reference, Brent Laing's tactical learning came mostly from interactions with knowledgeable teammates. Laing points out that the back-end on his championship team was always very open to his input on shot-selection decisions, and that allowed him to further his own development:

I've always prided myself on knowing what's going on," he says. "I think I got even better at that when I started to play and learn from [Teammates 5 and 6]. That was something I always really enjoyed, how much we discussed all the shots and how it was so open for suggestions. (Appendix F, p. 256)

Nolan Thiessen's tactical learning was also enhanced by discussions with his teammates, although in his case this typically occurred after the game. These discussions were part of formal post-game de-briefs, which were mandated by his championship coach, and often focused on creating an inventory of opposition weaknesses:

The other thing that [NT Coach 2] made us do was do a lot of was tactical de-briefs. ... We got to the point where we realized we were getting better at that type of thing, and it was through just a ton of discussion within the team. (Appendix G, p. 285)

Although Marc Kennedy also played with knowledgeable teammates, the dynamic on his championship team was not nearly as open as the one that Thiessen and Laing have described. In fact, because his Skip, MK Teammate 5, took an autocratic approach to shot selection, Kennedy ended up focusing mostly on his front-end tactical duties:

That let me focus on the progression from tracking ice, and cleaning paths, and understanding what shot was being called. All that developed from the mentality of 'focus on the process, not the result,' which I still think it's the most important thing in curling. (Appendix E, p. 230)

Period 3: After First International Men's Title to End of 2014-15 Season

As indicated in tables 4.21 and 4.22, these curlers invested an average of 7.3 years (ranges 5.0 to 9.0) and 1,186.2 total hours (range 698.0 to 1428.0) in tactical training in this period, for an average of 162.5 annual hours (range 139.6 to 179.1). It should be noted that this annual average is considerably higher than the 119.3 annual hours that they averaged in Period 2. Furthermore, the moderate range that existed among them on Period 3 annual hours suggests that these curlers' typical tactical training investments were now reasonably similar to one another.

From a qualitative perspective, of 17 meaning units related to the Tactical Expertise category emerged from these curlers Period 3 histories. Of these meaning units, nine were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that offers insight into the evolution of this component of their curling expertise. This common theme is as follows: *all curlers experienced accelerated tactical development when they started working with new team members.*

For Marc Kennedy, the difference in decision-making between his championship team and his new team has been dramatic, and has been something of a culture shock for both he and his continuing teammate. However, the fact that the on-ice decisions on his new team are much more collaborative has also created a tactical growth opportunity:

We've gone from a dictatorship to a democracy, so for [MK Teammate 7] and I, it's been a big change, and we just have to find where we fit. Especially, with me having been out of the decision-making process for so long. (Appendix E: pp. 236-237)

Although he is now part of the same team as Kennedy, Brent Laing's transition appears to have been somewhat less daunting. This may well be because his championship team also made shot selection decisions a group undertaking, but this certainly does not mean that his new team functions the same from a tactical perspective:

There's certainly more of a structure about how we get together. We do the mini-training camps before the big events...There's also a lot more chatter about game plans before games and after games in our meetings and debriefs, because we are trying to figure out how we play. (Appendix F, p. 263)

Brad Gushue's most recent tactical development has been a product of the fact that his newest teammates were relatively inexperienced when they joined the team, making it

necessary for him to become a mentor to them. However, as is often the case in mentorship situations, Gushue might have benefited as much as they have:

That's where I grew as a player...It's been rewarding for me to see how all of those players have evolved into what they are now... To see them gain the knowledge that [BG Teammate 2] and I gained from all those years playing on Tour. (Appendix D, p. 208)

Unlike the other three curlers in this study, the new team member who was the catalyst to Nolan Thiessen's tactical development has been a coach. This has a lot to do with the fact that his previous coach was a mental skills specialist, and that he has not had a knowledgeable tactical coach to guide him up to this point in his career:

After all those years of learning from [NT Coach 2], it's a good change for us to now have an experienced curling guy like [NT Coach 3] with us ...It was a lot of like, "Food for thought," or "What do you think about this shot?" (Appendix G, p. 292)

This section has described the ongoing development of the tactical component of these curlers' expertise in relation to the three career periods that have formed the basis of this study's core qualitative element. However, before moving on it is also important to examine the quantitative data surrounding their tactical training investments from a somewhat different perspective. More specifically, Tables 4.23 and 4.24 present these data in the same manner that these curlers' general training and competition investments were presented earlier in this chapter (i.e., in relation to attainment vs. refinement phases).

Table 4.23

A Comparison of Years and Hours in Tactical Training: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	9	1,174	10	599	11	1,113	12	699	10.5	896.3
Refinement	11	2,024	11	1,834	14	1,775	7	1,038	10.8	1,667.8
Career	20	3,198	21	2,433	25	2,888	19	1,737	21.3	2,464.0

Table 4.24

A Comparison of Annual Hours in Tactical Training: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	130.4	59.9	101.2	58.3	85.4
Refinement	184.0	166.7	126.8	148.3	154.4
Career	159.9	115.9	115.5	91.4	120.4

In examining these tables it should be noted that curlers invested an average of 10.5 years (range 9.0 to 12.0) and 896.3 total hours (range 599.0 to 1,174.0) in tactical training as they were attaining this expertise, for an average of 85.6 annual hours (range 58.8 to 130.4). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 1,680.2 total hours (range 1,038.0 to 2,024.0) as they were refining it, for an average of 154.4 annual hours (range 126.8 to 184.0). Recognizing that the ranges among them became closer as their careers progressed, the key finding here is that these curlers' annual tactical training investments grew considerably after they arrived at the elite level.

3. Physical Component

This section focuses on the most relevant elements of these athletes' histories related to the attainment and refinement of the physical component of their curling

expertise. In keeping with the inclusion criteria laid out in Appendix B, this *physical component is considered to include a curler's physiological and motor capabilities.*

Furthermore, this study has defined *physical training as any session designed to improve any aspect of a curler's fitness or athleticism.*

With these definitions in mind, this section describes the ongoing development of the physical component of these curlers' elite-level expertise. It includes common physical themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' physical training investments, which are summarized in Tables 4.25 through 4.28.

Table 4.25

A Comparison of Years and Hours Invested in Physical Training by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	3	750	7	1,176	3	150	4	1,605	4.3	920.3
Period 2	5	1,250	5	720	8	600	9	1,950	6.7	1,130.0
Period 3	9	2,150	7	1,296	8	775	5	1,425	7.3	1,411.5
Career	17	4,150	19	3,192	20	1,525	18	4,980	18.3	3,461.8

Table 4.26

A Comparison of Annual Hours Invested in Physical Training by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	250.0	168.0	50.0	401.3	214.0
Period 2	250.0	144.0	75.0	195.0	168.7
Period 3	238.9	185.1	96.9	285.0	193.4
Career	244.1	168.0	76.5	276.7	184.1

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.25 and 4.26 these curlers invested an average of 4.3 years (range 3.0 to 7.0) and 920.0 total hours (range 150.0 to 1,605.0) in physical training in this period, for an average of 214.0 annual hours (range 50.0 to 262.1). It should be noted that this annual average is somewhat higher than their career average of 184.1 annual hours. Furthermore, the substantial range that existed among them on Period 1 annual hours suggests that these curlers' typical physical training investments were initially quite different from one another.

From a qualitative perspective, total of 14 meaning units related to the Physical Expertise category emerged from these curlers Period 1 histories. Of these meaning units, seven were found to contribute to a common theme that is relevant to all four curlers experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers felt that they had natural physical abilities that gave them an early advantage over their peers.*

For Brent Laing this advantage has been relevant to all the sports that he played, and was based on his aptitude for picking up physical tasks quickly and easily. According to Laing, this was all part of his typical method of athletic learning, whereby he observed capable athletes in action and then imitated the movements that he saw them make:

Not to say that I'm great at everything, but there aren't very many things physically that I can't pick up. I'm pretty good at watching something and then being able to do it. Watching is the way I learn. If I see somebody do it properly, I can usually mimic them fairly well, and that's what I did. (Appendix F, p. 250)

Brad Gushue also felt that that he benefited from his natural physical abilities, but recognized that there were certain types of tasks that he was considerably better at than others. More specifically, he felt that he excelled at tasks that required superior hand-eye coordination, like curling, as compared to those that relied on other attributes:

Mainly, I just had really good hand-eye coordination. I think the sports that I excelled at really related to that... I wouldn't consider myself to be real athletic in a speed way or a power way, those are definitely not things that I'm natural gifted at. (Appendix D, p. 196)

Much like Gushue, Nolan Thiessen pointed to a physical attribute that is important in the sport of curling, and that came easily to him. Thiessen is unsure if he was naturally gifted with this attribute, or if it was a product of his extensive early athletic involvement, but either way he feels it was already in place when he started curling:

I don't know how, but I always just had balance. I don't know if I just naturally had it in me, or if it was a lot to do with playing other sports being a very athletic kid, but I could always just slide out. (Appendix F, p. 177)

Marc Kennedy emphasized a different aspect of athleticism in his comments, the capacity to practice longer and harder than the great majority of the young curlers he was competing against. Kennedy believes that he developed this capacity from playing and practicing other sports, and from being constantly in motion during his childhood years:

The idea of practicing an hour and a half or two hours a day wasn't something a lot of curlers were doing in juniors. But, it was just natural for me to bring that into the sport of curling at a young age, which meant practicing curling, and sweeping, and getting your heart rate up, and being athletic. (Appendix E, p. 220)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.25 and 4.26 these curlers invested an average of 7.0 years (range 5.0 to 10.0) and 1,130.0 total hours (range 600.0 to 1,950.0) in physical training in this period, for an average of 168.7 annual hours (range 75.0 to 250.0). It should be noted that this annual average is considerably less than the 214.0 annual hours that they recorded in Period 1. Furthermore, the substantial range that existed among them on Period 2 annual hours suggests that these curlers' typical physical training investments were still quite different from one another.

From a qualitative perspective, a total of 15 meaning units related to the Physical Expertise category emerged from these curlers Period 2 histories. Of these meaning units, eight were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers understood the importance of physical conditioning and did their best to fit it into their lives.*

Brad Gushue's comments suggest that he was highly committed to maximizing his physical conditioning during this period, to the point of almost being obsessed with it. According to Gushue, the primary motivation behind this commitment level was ensuring that he was more prepared than his opponents for the 2005 Olympic Trials:

I was a pretty fit guy in the year and a half leading up to the Trials. I believe I got down to about 9 percent body fat and was able to do, I think, 11.5 on the beep test. I could do 100 push-ups and 100 sit-ups. I was just so driven and so focused that I pushed myself hard in the gym. (Appendix D: p. 204)

Nolan Thiessen was also driven by his curling ambitions, and in particular by a desire not to fall behind his competitors. Consequently, partway through this period Thiessen decided to lose significant amount of weight, and did so by combining better nutritional habits with a vigorous exercise program led by a personal trainer:

That's also when I got a personal trainer, and started to have goals in the gym. That's when I did most of my transformation, because I was a pretty thick guy back then... We got to the point where every player was working out, so you had to or you were falling behind (Appendix G: pp. 285-286)

Marc Kennedy's comments add another dimension to our understanding an elite curler's physical development by showing that it is largely an off-season proposition. To this end, Kennedy describes his training schedule during this period, which seems to have been focused primarily on the months of May through August:

Summer was four months of going to the gym four days a week. I ended up working with the same trainer as [MK Teammate 5], so we were at the gym together all the time. (Appendix E, p. 231)

This reality presented somewhat of a problem for Brent Laing, who at this point was spending the great majority of his summer hours pursuing his career as a golf professional. This does not mean that he ignored his physical conditioning, but it is clear from his comments that he needed to find creative ways to fit it in with his life circumstances:

I was trying to get my card, so I needed to play lots of golf...It was always staying aerobically fit whatever you're doing, mountain biking, running all those things. Staying fit that way, and doing what you can on the side. (Appendix F, p. 256)

Period 3: After First Men's International Title to End of 2014-15 Season

As indicated in tables 4.25 and 4.26, these curlers invested an average of 7.3 years (ranges 5.0 to 9.0) and 1,411.5 total hours (range 775.0 to 2,150.0) in physical training in this period, for an average of 193.4 annual hours (range 96.9 to 285.0). It should be noted that this annual average is somewhat more than the 156.6 annual hours that they recorded in Period 2. Furthermore, the considerable range that existed among them on Period 3 annual hours suggests that these curlers' typical physical training investments remained considerably different from one another.

From a qualitative perspective, a total of eight meaning units related to the Physical Expertise category emerged from these curlers Period 3 histories. Of these meaning units, five were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that offers insight into the evolution of this component of their curling expertise. This common theme is as follows: *all curlers modified their approaches to physical conditioning to maintain their personal motivation.*

Brad Gushue leaves little doubt that the fundamental issue for him in recent years has been motivation, so he felt he needed someone else to drive his physical training. Consequently, he hired a personal trainer and believes that this move has been essential to him maintaining a high level of physical conditioning:

As I've gotten older, the motivation for me to get up and go to the gym myself is pretty much gone. I couldn't do it on my own anymore. If I didn't have a trainer working out with me now, boy, it'd be real hard for me to be in the shape that I'm in. (Appendix D, p. 210)

Nolan Thiessen has taken his approach to physical conditioning one step further by finding a multi-service facility where he does his training. According to Thiessen, this facility features an assortment of practitioners, ranging from trainers to therapists, and is frequented by elite athletes from a variety of different sports:

I've got this place that I go to now that I really enjoy. I've got a whole team behind me there. There are trainers, a chiropractor, massage, acupuncture; whatever I need. It's good for me in that its an environment where everyone in there's really building towards a goal. (Appendix G, p. 292)

Like Thiessen, Marc Kennedy also found a different place to workout during this period, and he seems happy with it. However, another modification that Kennedy has made to his approach to physical conditioning has been to inject a certain amount of competition into the mix by taking part in various races during the off-season:

I've incorporated running races, cycling races, and I found some trainers and people that I really enjoy. Because this is something that can get very tedious and difficult, and you want to keep it fresh and exciting. (Appendix E, pp. 237-238)

Finally, although his modifications came somewhat later than his counterparts, it is apparent that Brent Laing's approach to physical conditioning has evolved during this period. According to Laing, this situation has had a lot to do with his new teammates, who have made superior fitness a big part of the team's identity:

I have worked out more in the last 18 months than I have ever in that amount of time. It's absolutely motivating. I don't imagine that I'll ever keep up with [BL Teammate 9] and Marc, but I would like to get a little closer. (Appendix F, p. 263)

This section has described the ongoing development of the physical component of these curlers' expertise in relation to the three career periods that have formed the basis of this study's core qualitative element. However, before moving on it is also important to examine the quantitative data surrounding their physical training investments from a somewhat different perspective. More specifically, Tables 4.27 and 4.28 present these data in the same manner that these curlers' general training and competition investments were presented earlier in this chapter (i.e., in relation to attainment vs. refinement phases).

Table 4.27

A Comparison of Years and Hours in Physical Training: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	5	1,250	8	1,320	6	300	11	3,055	7.5	1,481.3
Refinement	12	2,900	11	1,872	14	1,225	8	1,925	11.3	1,980.5
Career	17	4,150	19	3,192	20	1,525	19	4,980	18.8	3,461.8

Table 4.28

A Comparison of Annual Hours Invested in Physical Training: Attainment vs. Refinement

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	250.0	165.0	50.0	277.7	197.5
Refinement	241.7	170.2	87.5	240.6	175.3
Career	244.1	168.0	76.5	276.7	184.1

In examining these tables it should be noted that curlers invested an average of 7.5 years (range 5.0 to 11.0) and 1,481.3 total hours (range 300 to 3,055) in physical training as they were attaining this expertise, for an average of 197.5 annual hours (range 50.0 to 277.7). By comparison, they invested 11.3 years (range 8.0 to 14.0) and 1,980.5 total hours (range 1,225.0 to 2,900.0) as they were refining it, for an average of 175.3 annual hours

(range 87.5 to 241.7). Although the ranges among them did get somewhat closer as their careers progressed, the key finding here is that no pattern is apparent in these curlers' annual physical training investments before vs. after reaching the elite level of the sport.

4. Mental Component

This section focuses on the most relevant elements of these athletes' histories related to the attainment and refinement of the mental component of their curling expertise. In keeping with the inclusion criteria laid out in Appendix B, this *mental component is considered to include a curler's psychological capabilities and personal mindset*. Furthermore, this study has defined *mental training as any session with a mental trainer, relevant self-study, or personal curling-related reflection*.

With these definitions in mind, this section describes the ongoing development of the mental component of these curlers' elite-level expertise. It includes common mental themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' mental training investments, which are summarized in Tables 4.29 through 4.32.

Table 4.29

A Comparison of Years and Hours Invested in Mental Training by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	6	1,440	9	1,276	9	1,680	1	140	6.3	1,134.0
Period 2	5	1,400	5	1,440	8	2,240	9	2,352	6.7	1,858.0
Period 3	9	1,880	7	2,016	8	2,240	5	1,960	7.3	2,024.0
Career	20	4,720	21	4,732	25	6,160	15	4,452	20.3	5,016.0

Table 4.30

A Comparison of Annual Hours Invested in Mental Training by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	240.0	141.8	186.7	140.0	180.0
Period 2	280.0	288.0	280.0	235.2	277.3
Period 3	208.9	288.0	280.0	392.0	277.3
Career	236.0	225.3	246.4	296.8	247.1

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.29 and 4.30 these curlers invested an average of 6.3 years (range 1.0 to 9.0) and 1,134.0 total hours (range 140.0 to 1,680.0) in mental training in this period, for an annual average of 180.0 annual hours (range 140.0 to 240.0). It should be noted that this annual average is considerably lower than their career average of 244.7 annual hours. Furthermore, the moderate range that existed among them in Period 1 annual hours suggests that these curlers' typical mental training investments were initially reasonably similar to one another.

From a qualitative perspective, a total of 29 meaning units related to the Mental Expertise category emerged from these curlers Period 1 histories. Of these meaning units, six were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers began to actively develop their mental skills through various self-directed activities.*

For Brent Laing, this involved reading books on sport psychology, and particularly those focused on golf. Part of the reason for this was Laing's interest and involvement in

that sport, but the other part had to do with the fact that there were few if any books of this type focused on the sport of curling at that time:

I was into golf at the time, so I was reading all the Bob Rotella books. Anything I could get my hands on, anything that anybody could recommend about sports psychology, especially as it related to golf. There weren't very many specific to curling at the time, and still aren't that many. (Appendix F, p. 250)

Interestingly, it seems that Brad Gushue, who was an avid golfer during this period, read some of the same books that Laing did. Based on his comments, beyond any benefit that these books may have had on his golf game, it appears that Gushue made an effort to apply lessons from these books to the sport of curling:

I read a couple of Dr. Bob Rotella's books. He talked about picking small targets and things like that. I started to bring that into curling a little bit, probably when I was 17 or 18. (Appendix D, p. 197)

Nolan Thiessen also appears to have read at least one sport psychology book at this time, although it was focused on his then main sport of baseball. In fact, by Thiessen's own admission, it was not until the final year of this period that he made any attempt to apply any of his mental training efforts to the sport of curling:

I started reading baseball books when I was about 16 or 17. I remember reading the 'Mental Game of Pitching', for example. But, I really didn't really apply any of that to curling until I was 20. (Appendix G, p. 278)

The focus of Marc Kennedy's self-directed mental training was personal reflection, which seems to have helped him to evolve his approach over time. More specifically,

although Kennedy had a difficult time dealing with his fears, he eventually developed some mental strategies that helped him to perform at a high level:

There were times where there was a lot of fear of making mistakes. But, just over those years of competing, and losing, and winning, you just develop some mental skills that you know work for you. What you have to say to yourself, how to deal with your own anxiety, your own nerves. (Appendix E, p. 224)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.29 and 4.30, these curlers invested an average of 6.7 years (range 5.0 to 9.0) and 1,858.0 total hours (range 1,400.0 to 2,352.0) in mental training in this period, for an average of 277.3 annual hours (range 235.2 to 288.0). It should be noted that this annual average is considerably more than the 180.0 annual hours that they recorded in Period 1. Furthermore, the moderate range that existed among them in Period 2 annual hours suggests that these curlers' typical mental training investments were still reasonably similar to one another.

From a qualitative perspective, a total of 27 meaning units related to the Mental Expertise category emerged from these curlers Period 2 histories. Of these meaning units, 9 were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers made good use of external support to enhance their mental development.*

For Brad Gushue, this involved re-connecting with a sport psychologist from the local university who had been instrumental in his World Junior victory. According to

Gushue, the year and a half that he and his teammates spent working with this sport psychologist prior to the 2006 Olympics was important to that triumph as well:

It was probably in 2004 that we really ramped it up again. Then, in 2005 and 2006, we kept on working with [BG Mental Trainer 1], and obviously had some pretty good success. (Appendix D, p. 204)

Nolan Thiessen had a very similar experience based on his interactions with his long-time team coach, who is also a sport psychologist. Thiessen's comments offer some insight into the work that he and his teammates did with their coach, which appears to have been focused on combatting pressure and maintaining perspective:

[NT Coach 2] worked a lot with us with how to perform under pressure. How to make sure that you play as well in the Brier final as you do in a regular bonspiel game...It's that type of work that he did a lot with us, and with me in particular. It was a lot of, "How do you not put too much into it?" (Appendix G, p. 287)

Marc Kennedy was pleased to have had the opportunity to learn from a sport psychologist associated with Curling Canada's La Releve Program during the early years of Period 1. In fact, he used this opportunity helped him to develop some mental strategies that he employed throughout the remainder of this period.

That was another aspect of the La Releve program back in those years. It helped me to put some things together on a personal level that helped me out on the ice. (Appendix E, p. 231)

Although he did not have any connection to a professional sport psychologist during this period, Brent Laing did have the chance work with a golf professional who had a knack

for teaching the mental side of the game. Laing credits this mentor with teaching him a technique that made it easy for him to move on from his mistakes:

He always used the analogy of a computer screen. Once you hit that shot, or once you throw that rock, the shot is gone and done. You minimize that computer screen, and it's done. (Appendix F, p. 257)

Period 3: After First Men's International Title to End of 2014-15 Season

As indicated in tables 4.29 and 4.30 these curlers invested an average of 7.3 years (ranges 5.0 to 9.0) and 2,024.0 total hours (range 925.0 to 2,150.0) in mental training in this period, for an average of 277.3 annual hours (range 208.9 to 392.0). It should be this annual average is identical to what that they averaged in Period 2. Furthermore, the substantial range that existed among them on Period 3 annual hours suggests that these curlers' typical mental training investments were now quite different from one another.

From a qualitative perspective, a total of 25 meaning units related to the Mental Expertise category emerged from these curlers Period 3 histories. Of these meaning units, five were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that offers insight into the evolution of this component of their curling expertise. This common theme is as follows: *all curlers displayed improvement-oriented mindsets that facilitated their success.*

Marc Kennedy's mindset has been a product of the skill enhancement program that he initiated early in this period, and the progress he has made in developing his game. In fact, it appears that Kennedy may now have reached the performance level that he had envisioned, and with that has come a sense of confidence to support his future ambitions:

I feel like my personal curling career has finally gotten to the level where I've dreamed of it being. In 2010 it was a dream to go to the Olympics and win, but I still wasn't the curler I wanted to be. Now, I'm really close, if not all the way there. (Appendix E, p. 237)

Much like Kennedy, Brent Laing also appears to have gained considerable confidence from his own skill enhancement program, although with that confidence has come a carefully considered perspective. More specifically, Laing is convinced that this program is a work in progress, and something that will never be entirely complete:

It's a sport that you'll never master. You can call yourself a master, but there's always something you can get better at. Over the last five or six years I've gotten better at a lot of things, and I continue to. (Appendix F, p. 260)

Nolan Thiessen's mindset seems to have emerged from winning the World Championship, and his recognition of the opportunity that came with it. To this end, Thiessen seems to have embraced the concept of professionalism, and has made an effort to ensure that he is always fully prepared for major competitions:

For me, it was like it opened the door to, "Hey, I need to be really professional about this, really take it serious, and really throw everything into it." Because, I wanted to stay at the top. (Appendix G, p. 287)

Brad Gushue's mindset is somewhat different than the other curlers' in that it is linked more to his failures than his successes. Gushue is convinced that there is more to learn from his set-backs than his triumphs, and appears quite willing to focus on the deficiencies that led to those set-backs in order to facilitate future improvement:

Looking back on my career so far, I think I've learned the most from some of the darker moments I've gone through. I think that the positive stuff it's fun, it's what you play for, but I don't think it necessarily makes you better. (Appendix D, p. 210)

This section has described the ongoing development of the mental component of these curlers' expertise in relation to the three career periods that have formed the basis of this study's core qualitative element. However, before moving on it is also important to examine the quantitative data surrounding their mental training investments from a somewhat different perspective. More specifically, Tables 4.31 and 4.32 present these data in the same manner that these curlers' general training and competition investments were presented earlier in this chapter (i.e., in relation to attainment vs. refinement phases).

Table 4.31

A Comparison of Years and Hours in Mental Training: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	8	2,000	10	1,564	12	2,520	8	1,708	9.5	1,948.0
Refinement	12	2,720	11	3,168	13	3,640	7	2,744	10.8	3,068.0
Career	20	4,720	21	4,732	25	6,160	15	4,452	20.3	5,016.0

Table 4.32

A Comparison of Annual Hours in Mental Training: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	250.0	156.4	213.3	213.5	205.1
Refinement	227.5	288.0	276.9	392.0	284.1
Career	236.0	225.3	246.4	296.8	247.1

In examining these tables it should be noted that curlers invested an average of 9.5 years (range 8.0 to 12.0) and 1,948.0 total hours (range 1,564.0 to 2,520.0) in mental

training as they were attaining this expertise, for an average of 205.1 annual hours (range 156.4 to 250.0). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 3,058.0 total hours (range 2,720.0 to 3,640.0) as they were refining it, for an average of 284.1 annual hours (range 227.5 to 392.0). Recognizing that the ranges among them clearly became farther apart, the key finding here is that these curlers' annual mental training investments were considerably larger after they arrived at the elite level.

5. Social Component

This section focuses on the most relevant elements of these athletes' histories related to the attainment and refinement of the social component of their curling expertise. In keeping with the inclusion criteria laid out in Appendix B, this *social component is considered to include a curler's interpersonal capabilities with teammates and coaches*. Based on this definition, and because the qualitative data confirm that this aspect of their expertise is closely related to their competitive experiences, this section utilizes curling competition as the corresponding metric.

With these definitions in mind, this section describes the ongoing development of the social component of these curlers' elite-level expertise. It includes common social themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' competition investments, which are summarized in Tables 4.33 and 4.34.

Table 4.33

A Comparison of Years and Hours Invested in Curling Competition by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	8	2,295	12	1,770	9	2,325	7	1,050	9.0	1,860.0
Period 2	5	1,794	5	1,281	8	2,286	9	2,418	6.8	1,944.8
Period 3	9	2,646	7	1,932	8	2,352	5	1,323	7.3	2,063.3
Career	22	6,735	24	4,983	25	6,963	22	4,791	23.3	5,868.0

Table 4.34

A Comparison of Annual Hours Invested in Curling Competition by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	286.9	147.5	258.3	150.0	206.7
Period 2	358.8	256.2	285.8	268.7	286.0
Period 3	294.0	276.0	294.0	264.6	282.6
Career	306.1	207.6	278.5	217.7	251.8

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.33 and 4.34 these curlers invested an average of 9.0 years (range 7.0 to 12.0) and 1,860.0 total hours (range 1,050.0 to 2,325.0) in curling competition, for an average of 206.7 annual hours (range 207.6 to 306.1). It should be noted that this annual average is considerably lower than their career average of 251.8 annual hours. Furthermore, the considerable range that existed among them in Period 1 annual hours suggests that these curlers' typical competition investments were initially quite different from one another.

From a qualitative perspective, a total of 27 meaning units related to the Social Expertise category emerged from these curlers Period 1 histories. Of these meaning units,

five were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers built relationships with junior teammate(s) that set the stage for future team experiences.*

Although Brent Laing had several close teammates in his junior days, the one with the most lasting impact was BL Teammate 2, who during this period alone shared two international titles with him. Because of these shared experiences, and the strength of their relationship, the two would remain effective teammates for the better part of two decades.

Having played with him for 18 years, and having gone through so many different stages and so many ups and downs, [BL Teammate 2] has probably been the teammate who's had the biggest influence on my career. (Appendix F, p. 247)

Along similar lines, Brad Gushue has also enjoyed an enduring partnership with BG Teammate 2, who was a member of his World Junior and eventually his Olympic team. According to Gushue, this partnership was forged on a shared commitment to hard work, which is something that appears to have set this teammate apart from the rest:

He had the same work ethic as me. We were at the rink the same amount of time. We were throwing the same amount of rocks...All the teammates who I had previous to that, I had a lot that worked hard, but none that even came close to working as hard as I did. (Appendix D, p. 195)

Unlike Gushue or Laing, who ended up playing with influential junior teammates for many years, Marc Kennedy has yet to curl with his brother during his men's career. However, that does not diminish the strength of the on-ice relationship that the two had at the time, or the ongoing influence that his brother's relaxed demeanor had on Kennedy:

He was pretty special at that age in terms of how good he was. I was more of just the hot-tempered, hard-throwing brother, just bringing the intensity level up, because Glen was a pretty calm guy. We just had a unique dynamic. (Appendix E, p. 221)

Nolan's Thiessen's situation is similar to Kennedy's in that he took a lot from his relationship a junior teammate who he has not competed with in men's play. However, in Thiessen's case the teammate was the talented but moody BL Teammate 1, and the lesson was about how to read and manage a highly strung teammate:

[NT Teammate 1] and I had a strange relationship in that I could be a little hard on him to get him going, because he could be a bit of a pouter...Then, there were also times when I'm like, "He's not going to miss, so just get out of his way and sweep his rocks." (Appendix G, p. 276)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.33 and 4.34 these curlers invested an average of 7.0 years (range 5.0 to 10.0) and 1,984.0 total hours (range 1,281.0 to 2,418.0) in curling competition in this period, for an average of 286.0 annual hours (range 241.8 to 358.8). It should be noted that this annual average is considerably more than the 206.7 annual hours that they recorded in Period 1. Furthermore, the substantial range that existed among them in Period 2 annual hours suggests that these curlers' typical competition investments continued to be quite different from one another.

From a qualitative perspective, a total of 36 meaning units related to the Social Expertise category emerged from these curlers Period 2 histories. Of these meaning units, 12 were found to contribute to a common theme that is relevant to all four curlers'

experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers advanced their social skills through interactions with experienced team members.*

For Marc Kennedy that team member was his World Championship and Olympic Skip, and the key lesson learned was about how to be an effective leader in the context of a major competition. To this end, Kennedy remembers a key contribution that his Skip made at the 2009 Worlds, which was the team's first international event together:

One thing I remember [MK Teammate 5] telling us is 'It's a World Championship, and it's a big stage, and there's lots of people, but it's still just the game of curling.' And, he had a way of portraying that on the ice. I found a lot of calm and peace of mind in that. (Appendix E, p. 227)

In Brent Laing's case, there were two experienced team members who enhanced his social development, the back-end on his first World Championship team. According to Laing, these teammates made he and his front-end partner feel welcome from the start, and facilitated a close-knit team dynamic that he saw as integral to their team's success:

It was a great run. That first couple of years with [BL Teammates 5 and 6], we had so much fun right away and got along so well off the ice... We just became a team in every sense of the word and I'm super proud of that. (Appendix F, p. 254)

Rather than learning from a teammate, Brad Gushue's social development was facilitated by his Olympic Coach, who appears to have taught him some important lessons about team dynamics. By his own admission, Gushue was not the best teammate at the time, but these lessons seemed to hit home and set the stage for his future development:

What [BG Coach 2] did, was he found a way to get the most out of everybody and to get us all working together as well as we could. I learned a lot from him in that regard, how to manage a team and get more out of players by how you handle yourself, how you handle them, how you speak, mannerisms on the ice, a lot of that stuff. (Appendix D, p. 202)

Nolan Thiessen's social development was also strongly influenced by his long-time coach, NT Coach 2 who taught him some practical engagement techniques that used moving forward. These techniques clearly enhanced Thiessen's social development, and in particular his ability to get the most out of his teammates in a game situation:

There are times during a game when if you notice the difference in the communication, or in one of the guy's actions, and you know that, "This isn't a good thing for us." Its all about how you get them out of that, get them re-engaged, and give our team the best chance to win. (Appendix G, p. 284)

Period 3: After First International Title to End of 2014-15 Season

As indicated in tables 4.33 and 4.34 these curlers invested an average of 7.3 years (ranges 5.0 to 9.0) and 2,063.0 total hours (range 1,323.0 to 2,646.0) in curling competition in this period, for an average of 282.3 annual hours (range 264.0 to 294.0). It should be noted that this annual average is very similar to the 277.8 annual hours that they recorded in Period 2. Furthermore, the moderate range that existed among them in Period 3 annual hours suggests that these curlers' typical competition investments were now quite similar to one another.

From a qualitative perspective, a total of 33 meaning units related to the Social Expertise category emerged from these curlers Period 3 histories. Of these meaning units, five were found to contribute to a common theme that is relevant to all four curlers'

experiences during this period, and that provides insight into the ongoing development of this component of their curling expertise. This common theme is as follows: *all curlers applied their previous social learning by playing leadership roles on their recent teams.*

For Brad Gushue this was product of his realization that sustained competitive success is about more than superior personal performances, and also requires strong team dynamics. Therefore, he has made a concerted effort to improve his interpersonal skills, and now takes pride in providing leadership to his less experienced teammates:

I think I'm a much more rounded curler. I think I've always been a really good shot-maker. But, I believe now I'm a much better leader. And, I think I'm an infinitely better teammate than I was in the past. (Appendix D, p. 208)

Nolan Thiessen has demonstrated a more specific form leadership that is based on his understanding that his teammates each have different needs and schedules. Therefore, he has found a way to create a flexible approach to organizing on-ice training sessions that still makes it possible for everyone to be prepared:

It got to the point where I just said, "I'm going to make practice times when I'm going to go. I'll email you at the start of the week, and you can join me for the ones you need to join me for" ...I think our team has always been really good and really professional in the way of not needing to be on top of each other, just saying, "You need to be prepared." (Appendix G, pp. 290-291)

Marc Kennedy appears to have learned a great deal from the inner workings of his championship team, and is now seeking to apply those lessons to his new team. Although he did not do so in an overt manner in their first season together, Kennedy believes that playing a leadership role will enhance his new team's chances of success:

This year was a feeling-out year for our new team to see where everybody fit, and I can now see my role. I'm going to have to be a little bit more of a leader, a little bit more of a voice, using the experience we had with our old team and trying to bring that to the new team. (Appendix E, pp. 235-236)

Although he and Kennedy are now teammates, Brent Laing appears to have a somewhat different opinion of what the new team needs to do in order to succeed. These differences notwithstanding, Laing's comments confirm that he is also playing a leadership role, and is attempting to apply his previous social learning to the current situation:

The four of us came from three different teams, and one of the challenges is realizing this is a new team. Not commenting about, "This is what we used to do." But, trying to create new norms and new habits, and a new we. (Appendix F, p. 263)

Proportional Investments

Based on the quantitative data presented around The Five Components of Curling Expertise, it is possible to determine the proportional investments that these curlers have made in all four types of training (i.e., technical, tactical, physical, and mental) over their full careers. Accordingly, Table 4.35 shows that that on average 17.9% (range 8.2% to 26.7%) of their career-long training time was devoted to technical training, 19.0% to tactical training (range 14.5% to 23.1%), 25.8% to physical training (range 12.2% to 40.9%), and 37.3% to mental training (range 28.7% to 49.4%). It should be noted that the ranges on all types of training are quite substantial, so much so that no two curlers show the same order in their career-long proportional investments.

Table 4.35

A Comparison of Proportional Investments in Different Types of Training: Career

Type	Gushue	Kennedy	Laing	Thiessen	Average
Technical	26.7%	18.3%	15.3%	8.2%	17.9%
Tactical	19.4%	19.2%	23.1%	14.3%	19.0%
Physical	25.2%	25.2%	12.2%	40.9%	25.8%
Mental	28.7%	37.3%	49.4%	36.6%	37.3%

It is also possible to determine the proportional training investments that these curlers made as they were attaining vs. refining their elite-level curling expertise.

Accordingly, Table 4.36 shows that that during the attainment phase an average of 21.0% (range 10.5% to 32.5%) of their training time was devoted to technical training, 16.4% to tactical training (range 11.5% to 22.3%), 27.0% to physical training (range 6% to 50.1%), and 35.6% to mental training (range 27.9% to 50.3%). By contrast, Table 4.37 shows that during the refinement phase an average of 15.7% (range 6.0% to 23.0%) of their training time was devoted to technical training, 20.9% to tactical training (range 17.1% to 23.7%), 24.9% to physical training (range 16.4% to 31.7%), and 38.5% to mental training (range 27.4% to 48.7%). In comparing these data sets, and without discounting the substantial ranges that existed among them during both phases, it should be noted that these curlers' average technical and physical investments declined somewhat, and that their tactical and mental investments increased somewhat, as they progressed from the attainment to the refinement phase.

Table 4.36

A Comparison of Proportional Investments in Different Types of Training: Attainment Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
Technical	32.5%	18.8%	21.4%	10.5%	21.0%
Tactical	17.9%	13.9%	22.3%	11.5%	16.4%
Physical	19.1%	30.8%	6.0%	50.1%	27.0%
Mental	30.5%	36.5%	50.3%	27.9%	35.6%

Table 4.37

A Comparison of Proportional Investments in Different Types of Training: Refinement Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
Technical	23.0%	18.0%	11.2%	6.0%	15.7%
Tactical	20.4%	21.9%	23.7%	17.1%	20.9%
Physical	29.2%	22.3%	16.4%	31.7%	24.9%
Mental	27.4%	37.8%	48.7%	45.2%	38.5%

These curlers' competition investments were presented earlier, but what has not yet been clarified is their proportional investments in different types of competition. With this in mind, Table 4.38 shows that on average just 18.3% of their career-long competition time was devoted to league games (range 15.5% to 24.5%), as compared to 81.7% to event games (range 75.5% to 84.5%). Furthermore, the fact that these ranges are quite moderate suggests that these curlers were quite similar in their proportional competition investments, with event games heavily favoured over league games in all cases.

Table 4.38

A Comparison of Proportional Investments in Different Types of Competition: Career

Type	Gushue	Kennedy	Laing	Thiessen	Average
League	24.5%	16.0%	16.0%	15.6%	18.3%
Event	75.5%	84.0%	84.0%	84.4%	81.7%

However, as was the case with their training investments, it is also important to compare these curlers' proportional competition investments as they were attaining vs. refining their elite-level curling expertise. Accordingly, Table 4.39 shows that that during the attainment phase an average of 36.7% of their competition time was devoted to league games (range 25.7% to 48.4%), as compared to 63.3% to event games (range 51.6% to 74.3%). By contrast, Table 4.40 shows that that during the refinement phase an average of just 1.3% of their competition time was devoted to league games (range 0% to 4.1%), as compared to 98.7% to event games (range 95.9% to 100%). In comparing these data sets, it is clear that these curlers' involvement in league play virtually disappeared as they as they progressed from the attainment to refinement phases. Furthermore, despite the ranges that existed among them during the attainment phase, these curlers were very similar in their discontinuation of league play during the refinement phase.

Table 4.39

A Comparison of Proportional Investments in Different Types of Competition: Attainment Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
League	48.4%	38.5%	34.3%	25.7%	36.7%
Event	51.6%	61.5%	65.7%	74.3%	63.3%

Table 4.40

A Comparison of Proportional Investments in Different Types of Competition: Refinement Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
League	4.1%	0%	1.5%	0%	1.3%
Event	95.9%	100%	98.5%	100%	98.7%

Other Sport Involvement and Success

This section focuses on the most relevant similarities that exist within these curlers' histories in relation to their involvement in other sports. Although not directly related to their elite-level curling expertise, there evidence to suggest that these curlers' other sport experiences have played an important role in their general athletic development. Furthermore, as detailed in their career histories (see Appendices D through F) all four curlers enjoyed national-level success in at least one other sport.

For example, Brad Gushue appeared in several Canadian Junior and Canadian Amateur Golf Championships, and was part of three evaluation camps put on by the Royal Canadian Golf Association (RCGA). Brent Laing was also quite adept at golf, eventually earning his Canadian Professional Golfers' Association (CPGA) card. Nolan Thiessen appeared in the 2001 Canada Summer Games in baseball, and went on to play at the high school and college level in the United States. Finally, Marc Kennedy played quarterback for the Edmonton Huskies of the Canadian Junior Football League (CJFL) for two seasons.

Building on their competitive success, this section examines these curlers involvement in other sports over the course of their curling careers. It includes common other sport themes for each career period, which emerged from this study's Qualitative Data Analysis Process (see Appendix B), along with supporting quotes from each curler. It also includes quantitative data related to these curlers' other sport investments, which are summarized in Tables 4.41 through 4.44.

Table 4.41

A Comparison of Hours and Years in Other Sports by Career Period

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Timeline	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.	Yrs.	Hrs.
Period 1	13	9,979	15	2,917	15	4,284	17	5,409	15.0	5,647.3
Period 2	5	1,440	5	475	8	1,584	10	306	7.0	951.3
Period 3	9	880	7	224	8	984	5	304	7.3	598.0
Career	27	12,299	27	3,616	31	6,780	32	6,019	29.3	7,178.5

Table 4.42

A Comparison of Annual Hours in Other Sports by Career Period

Curler>	Gushue	Kennedy	Laing	Thiessen	Average
Period 1	767.6	194.4	285.6	318.2	376.4
Period 2	288.0	95.0	198.0	30.6	135.9
Period 3	97.8	32.0	123.0	60.8	81.9
Career	455.5	133.9	218.7	188.1	245.0

Period 1: Start of Curling to End of Juniors

As indicated in tables 4.41 and 4.42 these curlers invested an average of 15.0 years (range 13.0 to 17.0) and 5,647.3 total hours (range 2,917.0 to 9,917.0) in other sports in this period, for an average of 376.5 annual hours (range 194.4 to 767.6). It should be noted that this annual average is substantially higher than their career annual average of 245.0 hours. Furthermore, the substantial range that existed among them on Period 1 annual hours suggests that these curlers' typical other sport investments were initially very different from one another.

From a qualitative perspective, 42 meaning units related to their other sports involvement emerged from these curlers' Period 1 histories. Of these meaning units, eight

were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that offers insight into the into the evolving role that other sports played in their lives. This common theme is as follows: *all curlers learned valuable lessons from their other sport involvement and applied those lessons to curling.*

For Marc Kennedy, who had an extensive competitive involvement in both soccer and football during this period, one of the key lessons he learned from these sports was the importance of hard work. According to Kennedy, this was a necessity in both of his other competitive sports, and was something that he chose to apply to curling as well:

One thing I learned from these sports was the work ethic. It was about being there for two hours a day, every day, being on time, and busting your butt. That's something I carried over to curling that not a lot of people in curling were doing. (Appendix E, p. 224)

Brad Gushue learned some very similar lessons from his other sport involvement, which was focused on golf and baseball. The importance of hard work, and its relationship to skill acquisition, became clear to Gushue in his early teens, and is something that led him to narrow his sporting involvement:

I learned early on that when you put in the time, you could definitely make big strides in how well you perform. That taught me a lot. (Appendix D, p. 194)

The lessons that Nolan Thiessen learned from baseball were also related to the importance of hard work and commitment, but these lessons did not come into focus until long after this period. Thiessen's believes that work ethic was the missing ingredient in his baseball career, but he has not allowed that to become a problem in curling:

Looking back on it, it makes me mad based on how I train now. I never trained like that back then, so it always makes me wonder how good could I have been if I had actually trained. (Appendix G, p. 274)

Although Brent Laing also learned about the importance of hard work from his other sport involvement, the lesson that seems to have truly hit home with him is related to teamwork. Based on his fastball, hockey, or volleyball experiences, Laing has learned a variety of team skills, and has subsequently applied these skills to the sport of curling:

Every team sport relates to any other team sport in my experience. The things I learned about being part of a team, and relying on other people, certainly carried into curling further down the road. (Appendix F, p. 250)

Period 2: Start of Men's to First Men's International Title

As indicated in tables 4.41 and 4.42 these curlers invested an average of 7.0 years (range 5.0 to 10.0) and 951.3 total hours (range 306.0 to 1,384.0) in other sports in this period, for an average of 135.9 annual hours (range 30.6 to 288.8). It should be noted that that this annual average is substantially less than the 376.5 annual hours that they recorded in Period 1. Furthermore, the substantial range that existed among them on Period 2 annual hours suggests that these curlers' typical other sport investments continued to be quite different from one another.

A total of nine qualitative meaning units related to the Other Sports dimension emerged from these curlers Period 2 histories. Of these meaning units, six were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the evolving role that other sports played in their

lives. This common theme is as follows: *all curlers' other sport involvement was focused on golf, with each using that sport for his own purposes.*

For Brad Gushue, who had been a highly competitive junior golfer, Period 2 was about finding a way to reduce the time and energy that he devoted to that sport. Although he was actually still quite active, the fact that Gushue's investment was now only about a third of what it had been seems to have given him the breathing room he was looking for:

For the previous years, curling would run right into golf, and golf would run right into curling. I never had any downtime. I was pushing myself so hard in both sports that I just needed a break. (Appendix D, p. 205)

Like Gushue, Nolan Thiessen was involved in golf on his own terms, and also made a point of not becoming overly invested in the sport. However, his rationale seems to have been related to his golfing skills, or lack thereof, which is something that offers insight into the importance Thiessen gives to proficiency in any sport:

I don't mind golf, but I can't do it too much, because I'm not that good at it, and it pisses me off. I want to be the best at something. (Appendix G, p. 286)

Although he had played a reasonable amount of golf during his younger years, Marc Kennedy's involvement in the sport in Period 2 seems to have been quite utilitarian in nature. In fact, Kennedy felt that the many similarities between golf and curling would enable him to use his other sport involvement to benefit his main sport:

At that stage I started to take golf a little more seriously, because golf and curling are so similar. It wasn't about trying to be the best golfer. It was about how to deal with misses, and deal with the technical part of golf. Using that to try to relate it over to curling. (Appendix E, pp. 231-232)

Like Kennedy, Brent Laing also took a utilitarian approach to golf, but in his case this had to do with his work aspirations. Despite his limited previous involvement with the sport, Laing was intent on becoming a club professional, and was convinced that his natural athleticism would give him an edge in his CPGA qualifying tournament:

All the things I ever did in my life I was able to do. Why would this be any different? I was naturally pretty good at golf. I naturally had a good swing, again just through watching and learning, and then got a little bit of instruction. (Appendix F, p. 257)

Period 3: After First Men's International Title to End of 2014-15 Season

As indicated in tables 4.41 and 4.42 these curlers invested an average of 7.0 years (range 5.0 to 10.0) and 598.0 total hours (range 224.0 to 880.0) in other sports in this period, for an average 81.9 annual hours (range 32.0 to 123.0). It should be noted that this annual average is considerably less than the 135.9 annual hours that they averaged in Period 2. Furthermore, the considerable range that existed among them on Period 3 annual hours suggests that these curlers' typical other sport investments continued to be quite different from one another.

A total of nine qualitative meaning units related to the Other Sports dimension emerged from these curlers Period 3 histories. Of these meaning units, six were found to contribute to a common theme that is relevant to all four curlers' experiences during this period, and that provides insight into the evolving role of other sports in their lives. This common theme is as follows: *all curlers remained involved in other sports, but now used this involvement primarily for enjoyment.*

Brad Gushue's other sport involvement is still focused exclusively on golf, but his approach to that sport continues to evolve over time. Although Gushue still manages to

maintain a single-digit handicap, he has greatly reduced the time he devotes to the sport as compared to the last period, and seems to have tempered his expectations accordingly:

Golf has just become an opportunity to get out, get some sun, and have a beer with a couple buddies. It's nothing more than a social thing now. (Appendix D, p. 211)

Like Gushue, Brent Laing has also reduced the time that he spends on golf, but this seems to have had more to do with practicing than playing actual rounds. To this end, now that he is no longer working as a CPGA Professional, Laing has clearly taken a more casual approach to golf during this period than he did previously:

I still play in some scrambles and some corporate stuff for curling, and play some golf with my dad and some buddies, but that's pretty much it. (Appendix F, p. 264)

Although Marc Kennedy spends about the same time on golf as he did during Period 2, and continues to play at about the same level, he seems to enjoy his involvement in the sport more than ever. Accordingly, Kennedy appears to be less focused on the technical aspects of the sport, and more focused on its tactical and mental aspects:

In recent years, I've started to focus much more on course management and the mental side of golf. So, even though I might not be technically as good now, I still score just as well and really enjoy the game. (Appendix E, p. 238)

By contrast to his peers, Nolan Thiessen has never had much of a passion for golf, has found enjoyment by re-engaging in his previous main sport of baseball. With this said, now that he is well into his thirties, Thiessen has gained a perspective that he did not have in the past, and is having a great time pitching in a semi-competitive baseball league:

It has definitely been fun to play baseball again, and to be little bit competitive. I used to tell people that, if I had the talent, I would leave curling in one second to go back to baseball. But, I just don't have the talent. I know I can be at the top of the podium in curling, and I obviously can't do that in baseball. (Appendix G, p. 293)

This section has described these curlers' ongoing involvement in other sports in relation to the three career periods that have formed the basis of this study's core qualitative element. However, before moving on it is also important to examine the quantitative data surrounding their other sport training investments from a somewhat different perspective. More specifically, Tables 4.43 and 4.44 present these data in the same manner that these curlers' sport-specific training and competition investments were presented earlier in this chapter.

Table 4.43

A Comparison of Years and Hours in Other Sports: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	15	10,619	16	3,072	18	4,902	25	5,613	18.5	6,051.5
Refinement	12	1,680	11	544	13	1,878	7	406	10.8	1,127.0
Career	27	12,299	27	3,616	31	6,780	32	6,019	29.3	7,178.5

Table 4.44

A Comparison of Annual Hours in Other Sports: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	707.9	192.0	272.3	224.5	327.1
Refinement	140.0	49.5	144.5	58.0	104.4
Career	455.5	133.9	218.7	188.1	245.0

In examining these tables it should be noted that these curlers invested an average of 18.5 years (range 15.0 to 25.0) and 6,015.5 total hours (range 3,072.0 to 10,619.0) in other sports as they were attaining their elite-level curling expertise, for an average of 327.1 annual hours (range 192.0 to 707.9). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 1,127.0 total hours (range 544.0 to 1,878.0) as they were refining that expertise, for an average of 104.0 annual hours (range 133.9 to 455.5). Recognizing that the ranges among them did get somewhat closer as their careers progressed, the key finding here is that these curlers' annual other sport investments were substantially smaller after arriving at the elite level of their main sport than they were before that point.

Combined Investments in Curling and Other Sports

Given that these curlers' other sport involvement has been shown to make a meaningful, but perhaps not direct, contribution to the development of their elite-level curling expertise, there is value in examining these curlers' combined sporting investments over the course of their careers. To this end, Tables 4.45 and 4.46 present these data in the same manner that these curlers' general training and competition investments were presented earlier in this chapter (i.e., in relation to attainment vs. refinement phases).

Table 4.45

A Comparison of Years and Hours in All Sporting Activities: Attainment vs. Refinement Phases

Curler>	Gushue		Kennedy		Laing		Thiessen		Average	
Phase	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours	Yrs.	Hours
Attainment	15	20,268	16	9,361	18	12,984	25	14,636	18.5	14,312.3
Refinement	12	15,248	11	11,914	13	13,236	7	8,042	10.8	12,110.0
Career	27	35,516	27	21,275	31	26,220	32	22,678	29.3	26,422.3

Table 4.46

A Comparison of Annual Hours in All Sporting Activities: Attainment vs. Refinement Phases

Phase	Gushue	Kennedy	Laing	Thiessen	Average
Attainment	1,351.2	585.1	721.3	585.4	773.6
Refinement	1,270.7	1,083.1	1,018.2	1,149.6	1,121.3
Career	1,065.7	603.4	621.8	568.1	705.8

In examining these tables it should be noted that these curlers invested an average of 18.5 years (range 15.0 to 25.0) and 14,312.3 total hours (range 9,361.0 to 20,268.0) in all sporting activities as they were attaining their elite-level curling expertise, for an average of 773.6 annual hours (range 585.1 to 1,351.2). By comparison, they invested 10.8 years (range 7.0 to 13.0) and 12,110.0 total hours (range 8,042.0 to 15,248.0) as they were refining that expertise, for an average of 1,121.3 annual hours (range 1,018.2 to 1,270.7). Without discounting the ranges that existed among them, the key finding here is that these curlers' annual sporting investments were greater after arriving at the elite level of their main sport than before that point.

With this said, Tables 4.47 and 4.48 provide important context to this finding by showing the proportional investments that these curlers made in curling vs. other sport activities during the attainment and refinement phases. Accordingly, Table 4.47 shows that that during the attainment phase an average of 57.7% of their time was devoted to curling (range 47.6% to 67.2%), as compared to 42.3% to other sports (range 32.8% to 52.4%). By contrast, Table 4.48 shows that that during the refinement phase an average of 90.7% of their time was devoted to curling (range 85.8% to 95.4%), as compared to 9.3% to other sports (range 4.6% to 14.2%). Recognizing that the ranges among them got closer as their

careers progressed, the key finding here is that these curlers' proportional investments in curling grew substantially after they arrived at the elite level their sport.

Table 4.47

A Comparison of Proportional Investments in Curling vs. Other Sports: Attainment Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
Curling	47.6%	67.2%	62.2%	61.6%	57.7%
Other Sports	52.4%	32.8%	37.8%	38.4%	42.3%

Table 4.48

A Comparison of Proportional Investments in Curling vs. Other Sports: Refinement Phase

Type	Gushue	Kennedy	Laing	Thiessen	Average
Curling	89.0%	95.4%	85.8%	94.9%	90.7%
Other Sports	11.0%	4.6%	14.2%	5.1%	9.3%

Chapter 5: Discussion

This study has carefully examined the career histories of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen in order to better understand the attainment and refinement of their elite-level curling expertise. This chapter considers this study's results from a number of different perspectives. It begins by discussing this study's key findings in relation to these curlers' competitive records, the development of each component of their curling expertise, and their involvement in other sports. It then connects these findings to the various personal, contextual, and process factors identified in Chapter 2, with an eye to advancing the related research literature. Finally, this chapter draws several evidence-based conclusions and makes related recommendations to those interested in the planned development of elite curlers.

A Sustained Record of Elite-Level Success

One of the key similarities among these curlers is the fact that they have all enjoyed long and successful competitive careers, beginning at the pre-men's level and eventually extending to the pinnacle of men's play. More specifically, all curlers managed to win multiple pre-men's titles, beginning with at least one Provincial Junior Championship and culminating with a gold medal at either the World Juniors or World Universiade. In many respects these latter accomplishments are consistent with the breakthrough performance proposed by Gulbin et al. (2013), since all four curlers went on to receive certain men's level opportunities on the basis of their pre-men's international titles.

To this end, it is important to recognize that all four of these curlers ended up being highly successful in men's play over the course of their careers. In fact, the results of this

study showed that they won an average of 19.0 men's major titles during a 10.8 year span between their first men's major title and their last recorded one. Furthermore, given that each of these curlers all managed to win at least one Olympic and/or World Championship over this same timeframe, it is safe to say that they all achieved the highest possible level of elite performance (i.e., sustained success or mastery) as defined by Gulbin et al. (2013).

With their many accomplishments in mind, it is possible to trace these curlers' career trajectories by way of five competitive milestones that they all reached. To this end, this study determined that their average ages and experience levels were age-17.0 and 7.8 years when they won their *first pre-men's major titles*, age-20.3 and 11.0 years when they won their *first pre-men's international titles*, age-23.3 and 14.0 years when they won their *first men's major titles*, age-26.5 and 17.3 years when they won their *first men's international titles*, and age 34.0 and 24.8 years when they won their *last recorded men's major titles*. Although experience levels were not reported, it should be noted that these ages are all considerably older than those presented by Gulbin et al. (2010) in their multi-sport study of Australian high-performance athletes. This suggests that it might take more time to achieve expert status in curling than it does in most other sports.

The Five Components of Curling Expertise

This study's qualitative data analysis process has confirmed the existence of five distinct components of curling expertise: technical, tactical, physical, mental, and social. The first four components were expected since specific questions were asked about them in this study's Qualitative Interview Guide. However, the social component emerged purely from the data, and is therefore an original contribution of this study. However, this is not

its' only original contribution, since distinct period-by-period themes have also been identified for all five components.

1. Technical Component

This study has generated the following definition of the technical component of curling expertise: *a curler's delivery, shot-making, and personal sweeping capabilities*. Table 5.1 provides a useful overview of how these curlers went about developing this component of their expertise over the course of their careers. From a quantitative perspective, this table reminds us that these curlers' technical training investments grew considerably from Period 1 to Period 2, before stabilizing in Period 3. From a qualitative perspective, it summarizes the common technical themes that were identified for each career period.

Table 5.1

Average Annual Technical Training Hours and Common Technical Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	83.9	<i>All curlers relied on a junior coach to help them with their technical development.</i>
Period 2	119.3	<i>All curlers had access to a knowledgeable teammate as a technical practice partner.</i>
Period 3	116.2	<i>All curlers adjusted the nature of their technical training in order to further enhance their skills.</i>

These themes show a clear shift in responsibility from coach to teammate, and then from teammate to self. The fact that coaches did not play leading technical roles after Period 1 makes these curlers' experiences very different from the elite rowers studied by Côté and Sedgwick (2003), who continued to rely heavily on their coaches for technical help when they were national team members. Furthermore, the fact that these curlers

used more experienced teammates as technical advisors during Period 2 extends the findings of studies by Balish and Côté (2013), who found older and more accomplished teammates to serve as informal teachers to younger athletes. Finally, the fact that these curlers changed their technical training after producing world-leading results aligns with the international champions studied by Durand-Bush and Salmela (2002), who were found to embrace creativity and innovation at this same point in their careers.

2. Tactical Component

This study's qualitative data analysis process generated the following definition of the tactical component of curling expertise: *a curler's pre-shot and in-shot decision-making capabilities*. Table 5.2 provides a useful overview of how these curlers went about developing this component of their expertise over the course of their careers. From a quantitative perspective, this table reminds us that these curlers' tactical training investments grew considerably from Period 1 to Period 2, and again from Period 2 to Period 3. From a qualitative perspective, it summarizes the common tactical themes that were identified for each career period.

Table 5.2

Average Annual Tactical Training Hours and Common Tactical Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	77.6	<i>All curlers improved their tactical understanding by watching curling games involving elite competitors.</i>
Period 2	119.3	<i>All curlers experienced most of their tactical development in and around the competition environment.</i>
Period 3	162.5	<i>All curlers experienced accelerated tactical development when they started working with new team members.</i>

It is interesting to note that the common tactical theme for these curlers in Period 1 had nothing to do with their own on-ice training, but rather with observing elite-level curling games. A similar situation continued into Period 2, although their frame of reference was now their own competitive involvement as opposed to that of others. However, in both cases competition was the main vehicle for the development of these curlers' tactical expertise. Understanding that this could be a unique finding to the four curlers in this study, it is contrary to Williams and Ford (2008), who determined that deliberate practice was the key contributor to an assortment of tactical adaptations in sport. Finally, the fact that these curlers all reported accelerated tactical development as a result of working with new team members during Period 3 suggests that teaching and/or being taught by new teammates or coaches should also be seen as playing an operative role in this regard.

3. Physical Component

This study's qualitative data analysis process generated the following definition of the physical component of curling expertise: *a curler's physiological and motor capabilities*. Table 5.3 provides a useful overview of how these curlers went about developing this component of their expertise over the course of their careers. From a quantitative perspective, this table reminds us that these curlers' physical training average annual were greatest in Period 1, then declined considerably in Period 2, before increasing in Period 3. From a qualitative perspective, it summarizes the common physical themes that were identified for each career period.

Table 5.3

Average Annual Physical Training Hours and Common Physical Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	214.0	<i>All curlers felt that they had natural physical abilities that gave them an early advantage over their peers.</i>
Period 2	156.0	<i>All curlers understood the importance of physical conditioning and did their best to fit it into their lives.</i>
Period 3	198.5	<i>All curlers modified their approaches to physical conditioning to maintain their personal motivation.</i>

Although the physical component of a curling expertise can be developed through a strong commitment to fitness training, this development was most likely facilitated by the strong foundation of athleticism that these curlers already had. To this end, it is noteworthy that all four curlers felt that they had natural physical abilities, which goes beyond Gulbin et al. (2010), who found that that 63% of the high performance athletes in their sample felt they had these same abilities. With this said, it cannot be overlooked that these curlers have maintained their commitment to physical conditioning for nearly two decades. This finding counters the argument made by Smith (2003), by showing that it is entirely possible for an elite athlete to be both a ‘workhorse’ and a ‘thoroughbred’.

4. Mental Component

This study’s qualitative data analysis process generated the following definition of mental component of curling expertise: *a curler’s psychological capabilities and personal mindset*. Table 5.4 provides a useful overview of how these curlers went about developing this component of their expertise over the course of their careers. From a quantitative perspective, this table reminds us that these curlers’ average annual mental training investments grew considerably from Period 1 to Period 2, before stabilizing in Period 3.

From a qualitative perspective, it summarizes the common mental themes that were identified for each career period.

Table 5.4

Average Annual Mental Training Hours and Common Mental Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	180.0	<i>All curlers began to actively develop their mental skills through various self-directed activities.</i>
Period 2	265.4	<i>All curlers made good use of external support to enhance their mental development.</i>
Period 3	277.3	<i>All curlers displayed improvement-oriented mindsets that facilitated their success.</i>

It is clear that these curlers all recognized the importance of the mental component of their curling expertise during their junior careers, and showed a strong commitment to developing it from that point forward. This is confirmed by the initiative that each of them showed in embarking on self-directed learning during Period 1, and in their subsequent use of external support during Period 2. However, perhaps most significantly, it has manifested itself in a mindset of ongoing improvement, which although emphasized during Period 3, was likely present well before that. This mindset aligns with Collins et al. (2016), who found that accomplished elite athletes tended to be intrinsically motivated to improve, and inclined to deal with challenge in a productive manner. It also aligns with Lizmore et al., (2016), who found that the healthy perfectionistic curlers in their study responded to mistakes with self-confidence and optimism.

5. Social Component

This study's qualitative data analysis process generated the following definition of the social component of curling expertise: *a curler's interpersonal capabilities with teammates and coaches*. Table 5.5 provides a useful overview of how these curlers went about developing this component of their expertise over the course of their careers. From a quantitative perspective, this table reminds us that these curlers' average annual curling competition investments (i.e., this study's metric for social development) grew noticeably from Period 1 to Period 2, before stabilizing in Period 3. From a qualitative perspective, it summarizes the common social themes that were identified for each career period.

Table 5.5

Average Annual Curling Competition Hours and Common Social Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	206.7	<i>All curlers built relationships with junior teammate(s) that set the stage for future team experiences.</i>
Period 2	277.8	<i>All curlers advanced their social skills through interactions with experienced team members.</i>
Period 3	282.6	<i>All curlers applied their previous social learning by playing leadership roles on their recent teams.</i>

These themes show that as these curlers' interpersonal capabilities evolved, their roles changed within their teams. However, it is evident from their histories that they understood and accepted their various roles, and believed that playing them well would help their teams to function better. It is also evident that these curlers benefited from and/or contributed to positive communication with team members over the course of their careers. These findings support those of Holt and Sparkes (2002), who showed how role clarity and acceptance and effective communication can both contribute to enhanced team

cohesion. Finally, the fact that these curlers all took on leadership roles later in their careers aligns with the findings of studies by Henriksen et al., (2010a, 2010b, and 2011), which all demonstrated how more experienced athletes served as proximal role models for younger teammates.

The Benefits of Other Sport Involvement

Given that there was no way to know whether these curlers' other sport involvement connected to the attainment and/or refinement of their elite-level curling expertise, this study was designed to examine their other sport and curling activities separately. With this said, it cannot be overlooked that curling was not the only sport that they found success in, especially considering that all four had in fact reached the national level in at least one other sport. This goes well beyond the findings of Gulbin et al., (2010), who reported that just 22% of the high performance athletes in their sample had reached the national level in a sport other than their main one. With this said, the athletes studied by Gulbin and colleagues represented three distinct levels (i.e., advanced, pre-elite, and elite), as compared to the curlers in the current study who were all at the elite level.

Based on their track records, it is clear these curlers took their other sports quite seriously, and invested considerable time in them. Table 5.5 provides a useful overview of the nature and extent of these curlers' other sport involvement over the course of their careers. From a quantitative perspective, this table reminds us that these curlers' average annual other sport investments were by far their greatest during Period 1, and then declined progressively during both Periods 2 and 3. From a qualitative perspective, it summarizes the common other sport themes that were identified for each career period.

Table 5.6

Average Annual Other Sport Hours and Common Other Sport Themes

Timeline	Annual Hours	Qualitative Themes
Period 1	376.4	<i>All curlers learned valuable lessons from their other sport involvement and applied them to curling.</i>
Period 2	135.9	<i>All curlers' other sport involvement was focused on golf, with each using that sport for his own purpose.</i>
Period 3	81.9	<i>All curlers remained involved in other sports, but now used this involvement primarily for enjoyment.</i>

With one possible exception, these curlers' other sport experiences during Periods 2 and 3 do not seem to have contributed to their curling expertise. That exception is Brent Laing, who continued pursuing his goal of becoming a golf professional for most of Period 2, and who reported certain direct mental benefits from that pursuit. With this said, all curlers seem to have benefited from their other sports involvement during Period 1, including mentally (e.g. commitment) and socially (e.g. teamwork). Furthermore, based on their comments, it seems likely that their natural athleticism not only helped these curlers succeed in other sports, but was also developed by their involvement in them.

However, contrary to the findings of Berry et al. (2008) in their study on Australian-rules football players, there does not appear to have been any tactical skill transfer from these curlers' other sport involvement. On the other hand, this study's results do support the general concept of physical literacy described by Canadian Sport for Life (2014), whereby diversified sporting involvement is thought to provide athletes with the competence, confidence, and motivation to potentially to excel in their eventual main sport. With this said, Canadian Sport for Life indicates that physical literacy is built during childhood, while this study's results suggest that these curlers' other sport involvement

enhanced their physical, mental, and social capabilities well into adolescence. Therefore, from a foundational perspective at least, a reasonable argument can be made that these curlers' other sport involvement contributed to their elite-level curling expertise.

Factors Affecting Elite-Level Curling Expertise

The theoretical rationale for this study is situated in a wide range of academic literature on talent and athlete development. As established in Chapter 2, this literature includes numerous studies and articles related to personal, contextual, and process factors that are believed to affect the development of athletic expertise. This section will revisit this literature, using the results of this study to support or refute certain assumptions and to provide useful sport-specific insight.

Personal Factors

Chapter 2 identified a number of personal factors (i.e., those internal to the athlete) that could potentially affect the attainment and/or refinement of elite-level curling expertise. One of these factors is favourable genetics, which in concert with appropriate developmental activities is believed to enhance an athlete's odds of achieving expert status (Davids & Baker, 2008). To this end, it is noteworthy that all four curlers in this study believed that they had natural abilities that gave them an advantage early in their athletic careers. Recognizing that such natural abilities are thought to be largely genetic in nature (Gagne, 2010), it may well be that these curlers have favourable genetics.

However, regardless of its origins, there is ample evidence that these curlers possess a good measure of athletic talent. For example, their histories confirm that all four were able to learn curling and other sport skills quickly and easily, which according to

Tranckle and Cushion (2006) is one of the best indicators of talent. Furthermore, they all had exceptional competitive results during their pre-men's curling careers, which in all cases culminated with an international title. These results support the perspective of Gulbin et al. (2013), whereby the best young prospects have a breakthrough performance during their younger years that sets them up for future elite-level involvement. Conversely, they run counter to both Martindale et al. (2007) and Güllich and Emrich (2014), who found junior results to be a questionable predictor of eventual elite-level success.

As it relates to their physical characteristics, in the absence of objective testing data there is no way to know for certain whether these curlers were superior to their peers from a physiological perspective. However, the fact that only Marc Kennedy was involved in extensive physical training prior to late adolescence would suggest that, unlike the rugby players studied by Till et al. (2011), these curlers were unlikely to have had a practical advantage in this area over their junior peers. The same logic cannot be applied to subsequent years, however, since it is evident that all four curlers were committed to maintaining a high fitness level during Periods 2 and 3. In light of this commitment, and although there is no evidence to confirm a physiological advantage, it seems unlikely that these highly successful curlers were at a disadvantage to their adult peers in this area.

Along similar lines, without a battery of psychological tests like the ones utilized by Gould et al. (2002) there is also no way to know for certain whether these curlers were superior to their peers from a mental perspective. With this said, it is clear that all four began to work on their mental skills during Period 1, and remained quite diligent about their mental training for the rest of their careers. However, it should be noted that their mental training was not always formal (i.e., involving a sport psychologist), but instead

typically involved self-study and/or personal reflection. This seemingly aligns with the conception offered by Gould et al. (2002) whereby elite athletes often learn mental skills through informal and/or indirect means.

Contextual Factors

Chapter 2 also identified a number of contextual factors (i.e., those in the athlete's environment) that could potentially affect the attainment and/or refinement of elite-level curling expertise, including those that are cultural in nature. However, contrary to argument made by Williams and Ford (2008), even though curling is a popular and culturally significant sport in Canada, the fact that two of the four curlers in this study (Nolan Thiessen and Brad Gushue) started curling at age-11 or later would suggest that early engagement was not a necessity for these curlers. Moving on to geographical considerations, it should be noted that two of the four (Thiessen and Brent Laing) grew up in stand-alone communities of less than 50,000 people, which could suggest that, like the professional athletes from hockey, baseball, basketball, and golf studied by Côté et al. (2006), elite curlers are more likely to come from smaller communities than is the general population. With this in mind, as per Côté and colleagues' suggestion, it is possible that Thiessen and Laing may have benefited in ways that the other two curlers did not, including by having easier access to training facilities.

However, based on their individual histories (see Appendices D through G) it appears that all four curlers had ready access to practice ice at their curling clubs during their junior years. This includes Marc Kennedy and Brad Gushue, who both grew up in larger metropolitan areas. Therefore, it may be that organizational factors played a more

instrumental role on these curlers' development than did geographic ones. Along these lines, it appears that the curling clubs that they were part of growing up shared at least one of the characteristics of the sporting clubs examined by Henriksen et al., (2010a, 2010b, and 2011): an open and cooperative relationship between coaches, organizers, club members, and parents. It also appears that these curlers' championship teams had certain similarities to the successful university teams described by Vallée and Bloom (2005), with the most pivotal being a shared vision that facilitated their ongoing success. However, unlike these university teams, this vision does not seem to have been generated by their coaches, but rather by the curlers and their teammates.

Along similar lines, this study has shown that teammates have contributed to these curlers evolving expertise throughout their careers. More specifically, it is clear that they shared key developmental experiences with teammates in Period 1, learned important lessons from more experienced teammates in Period 2, and began to share their expertise with new teammates in Period 3. These results extend the findings of studies by Henriksen et al., (2010a, 2010b, and 2011) and Balish and Côté (2014), which both showed that teammates can serve as proximal role models and active agents in the developmental process. They are also aligned with Copley and Baker (2009), who made the case that both observation and modeling of others, along with technical and tactical discussions with peers, can make important contributions to the development of elite-level expertise.

Beyond those of their teammates, this study also provided important insight into the varied contributions that coaches made over the course of these curlers' careers. For example, although coaches appear to have played a multi-faceted developmental role during Period 1, this was not the case after that point. Instead, these curlers' histories

confirm that their coaches' roles were in fact quite limited and specialized after their junior years, with their focus ranging from assisting with specific aspects of their development to general organization and facilitation. This is contrary to the findings of Gulbin et al. (2010), whereby the importance that athletes gave to coaches grew considerably as their careers progressed, with these coaches' knowledge and drive being valued more and more over time. It is also contrary to the findings of Côté and Sedgwick (2003), who showed that expert coaches were valued by their elite athletes for their ability to plan proactively for training and competition, to create a positive training environment, and to teach technical skills effectively.

Finally, as it relates to family involvement, the results of this study generally confirm the findings of Côté (1999) in that these curlers' parents played supporting rather than direct developmental roles. Therefore, they do not align with the findings of Hayman et al. (2011), who reported that the junior elite golfers in their sample were all inspired by the direct involvement of their fathers in their early years. In fact, only Marc Kennedy had a comparable situation whereby his father was directly involved in getting him started in curling. It is also noteworthy that his father ended up coaching him for his entire junior career, which clearly sets Kennedy's pathway apart from the other curlers in this study. The same can be said for the fact that Kennedy was the only curler to have a sibling as a regular teammate, in his case for nearly a decade. In fact, his situation is not only unique within this study, but also goes beyond Côté (1999) who found siblings to play indirect roles as opposed to being part of the developmental process.

Process Factors

Finally, Chapter 2 identified a number of process factors (i.e., those directly related to training and/or competition) that could potentially affect the attainment and/or refinement of elite-level curling expertise. More specifically, it examined a variety of academic literature surrounding three development models: the Expert Performance Theoretical Framework (Ericsson, et al., 1993), the Developmental Model of Sport Participation (Côté et al., 2009), and the Long-Term Athlete Development Framework (Canadian Sport for Life, 2014).

Expert Performance Theoretical Framework

The central premise of the Expert Performance Theoretical Framework (EPTF) is that a prolonged engagement in deliberate practice is the key contributor to expertise in any domain. According to Ericsson et al. (1993), deliberate practice is structured training that is specifically designed to improve current performance, to require full attention and effort, and to offer opportunities for repetition, immediate feedback, and error detection and correction. Beyond these requirements, Williams and Ford (2008) noted that deliberate practice has typically been operationalized in sport to include both team and individual training sessions. The current study has followed this established practice in quantifying its' curlers' investments, and has done so in relation to four distinct types of training (i.e., technical, tactical, physical, and mental). This approach is consistent with the one taken by Soberlak & Côté, (2003) in their study of elite hockey players, recognizing that they also chose to include both on and off-ice training in their operational definition of deliberate practice.

It is noteworthy that these curlers had accumulated 14.0 years of sport-specific experience by the time they were confirmed at elite level of their sport (i.e., when they won their first men's major titles), which is consistent with the assertion of Ericsson et al. (1993) and of the EMPF that it takes at least 10-years to attain expert status. However, the 5,485.0 sport-specific training hours that they accumulated to this same point obviously falls well short of EMPF's much-discussed 10,000-hour benchmark. At the same time, however, these curlers' accumulated hourly total clearly exceeds the 3,072.0 deliberate practice hours that Soberlak and Côté (2003) reported for the just confirmed elite hockey players in their study, thereby lending additional support to the idea that it may take more time to achieve expert status in curling than it does in other sports.

Beyond the attainment of their elite-level expertise, it cannot be overlooked that these curlers averaged an additional 7,964.0 sport-specific training hours as they were refining it. This represents a unique contribution of this study, since there are no known studies that have reported on the hourly training investments of already elite athletes. The same can be said about these curlers' proportional investments in different types of training over the course of their careers, which this study has documented with respect to both the attainment and refinement phases. To this end, it should be noted that these curlers' proportional training investments during the attainment phase were 21.0% technical, 16.4% tactical, 27.0% physical, and 35.6% mental, as compared to 15.7% technical, 20.9% tactical, 24.9% physical, and 38.5% mental during the refinement phase. However, it should also be noted that considerable variability existed among these curlers during both phases, so much so that no two curlers displayed the same rank order in their proportional investments over the course of their full careers.

Finally, although Ericsson et al. (1993) did not acknowledge the potential developmental contribution of competition on the grounds that it offers insufficient opportunities for participants to improve specific weaknesses, the current study offers a different perspective. More specifically, it has shown competition to be an important vehicle for the development of the tactical component of these curlers' expertise, initially through viewing curling games involving already-elite competitors and later through their direct personal involvement. This study has also shown that, across all career periods, these curlers have worked on the social component of their expertise in and around the competition environment, both through on-ice interactions and off-ice discussions. With these results in mind, there may be grounds for the EMPF to acknowledge the direct contribution of competition, either by expanding its definition of deliberate practice or by adding it as a relevant developmental activity on its own.

Developmental Model of Sport Participation

The central premise of the Developmental Model of Sport Participation (DMSP), and specifically its Early Sampling Pathway, is that elite-level sporting expertise can effectively be achieved through diversified sporting involvement during childhood. More specifically, Côté et al. (2009) suggest an involvement in a wide range of sports during the Sampling Years (ages 6-12), followed by a narrowing to a smaller number of sports during the Specializing Years (ages 13-15), and an exclusive focus on a single sport during the Investment Years (ages 16 and up). The current study's results make it possible to assess the validity of the DMSP's predictions, at least in the sport of curling. For instance, as predicted, all four curlers were involved in numerous sports during the Sampling Years,

although significantly in Brad Gushue's case curling was not one of them. Furthermore, as predicted, these curlers all narrowed their involvement to two or three sports during the Specializing Years, with curling now part of this mix for everyone. However, during the Investment Years, three of these curlers experiences (i.e., Brad Gushue, Marc Kennedy, and Nolan Thiessen) were contrary to the predictions of the DMSP in that they were still highly competitive in another sport. In fact, in Thiessen's case he actually chose to focus exclusively on baseball at age-17, before eventually returning to curling two years later.

This study's results also make it possible to assess the validity of the aggregate 10,000-hour metric proposed by Côté and Fraser-Thomas (2008), whereby this total might be reached when all sport-specific and other sport activities are combined. However, the fact that these curlers had accumulated 14,312.3 sporting hours upon reaching the elite level suggests that this particular benchmark is too low, at least when applied to the sport of curling. With this established, this study's results also make it possible to compare their sport-specific investments (i.e., curling training and competition) to those of athletes from other sports. More specifically, these curlers' 8,260.8 sport-specific hours were well in excess of the sport-specific totals reported by Baker et al. (2003) for three team ball sports (i.e., 5,909.0 hours in basketball, 3,584.0 hours in field hockey, and 2,260.0 in netball). On the other hand, they were somewhat less than the 9,014.0 hockey-specific hours that are apparent from the data reported by Soberlak and Côté (2003). Considering that these data were drawn from elite-level athletes (i.e., members of national or professional teams), it is apparent that different investments are required from sport to sport to achieve expert status, and that curling has among the highest known requirements.

In keeping with the possibility left open by Côté (1999), this study supports the idea of adding a fourth stage to the DMSP that would focus exclusively on the refinement of elite-level expertise, and that might be called the 'Refinement Years'. However, unlike the approach taken by Durand-Bush and Salmela (2002), the results of this study suggest that such a stage would best begin when these curlers were first confirmed as having reached the elite level of the sport, (i.e., when they won their first men's major titles) as opposed to when they reached the top of the international podium. The rationale here is that these curlers were all posting top-notch results, and were consumed with refining their skills, by this point of Period 2, which by definition is before they won their first men's international titles. With this established, it is noteworthy that these curlers invested an additional 12,110.0 combined sporting hours and 11,056.2 sport-specific hours *after* they were confirmed at the elite level. These findings represent unique contributions of the current study, since no known comparative data are available in any other sport.

Long-Term Athlete Development Framework

The central premise of the Long-Term Athlete Development (LTAD) framework is that different training and competition investments are required during each stage of development (i.e., Active Start, FUNdamentals, Learn to Train, Train to Train, Train to Compete, and Train to Win). With this said, LTAD's developers (Balyi et al., 2005, and Canadian Sport for Life, 2014) allow for considerable sport-specific latitude with respect to the model's content and structure. Along these lines, the results of the current study make it possible to assess certain aspects of the design of Curling Canada's LTAD (Dagg-Jackson et al., 2008). For example, they do not support the need for a curling-specific Learn to

Train stage (i.e., ages 9-12 for males), since Brad Gushue had not even initiated his curling involvement at that time. However, they do support Curling Canada's guidelines for the Train to Train stage (ages 12-16 for males), since there is ample evidence to suggest that they were all on the ice at least twice a week during this stage, and that they were all participating in weekend events.

Significantly, this study's results question need for separate Train to Compete 1 (i.e., ages 16-18) and Train to Compete 2 (i.e., ages 18-20) stages. In fact, given that both Gushue and Marc Kennedy were already regular competitors at the Canadian Juniors during the Train to Compete 1 stage, they actually refute it to some degree. With this said, this approach does seem quite appropriate to today's competitive landscape, which includes a well-developed under-18 playdown structure along with a supporting bonspiel circuit. Similarly, this study's results also question the need for separate Train to Win 1 (i.e., ages 21-25) and Train to Win 2 (i.e., ages 26+) stages, especially since Gushue and Brent Laing were part of the National Team Program by age-24, and since Kennedy was by age-25. However, considering that the Train to Win 1 stage now accommodates a well-developed university and college curling structure, which was very much in its infancy when Thiessen and Kennedy won Universiade gold, Curling Canada's decision to split these stages is very much in keeping with today's realities.

Regardless of their specific entry criteria or intent, a strong case can be made that every stage of Curling Canada's LTAD could benefit from more detailed and prescriptive advice related to the progressive development of curling expertise. This might begin by ensuring that the training to competition ratios associated with its various stages are as accurate as possible. To this end, this study has identified the training to competition ratios

that were actually employed by these curlers at each stage of their careers. These ratios are included in Table 5.7, where they are compared to ratios recommended by Curling Canada's LTAD (Dagg-Jackson et al., 2008), along with the ones in the generic versions of LTAD (Balyi et al., 2005; Canadian Sport for Life, 2014).

Table 5.7

A Comparison of Actual vs. Recommended Training to Competition Ratios

LTAD Stages	Generic LTAD	Curling's LTAD	Study Averages
Train to Train	60:40	67:33	49:51
Train to Compete 1	40:60	75:25	59:41
Train to Compete 2	40:60	75:25	75:25
Train to Win 1	25:75	80:20	69:31
Train to Win 2	25:75	80:20	70:30

As this table reminds us, the actual training to competition ratios used by these curlers had an almost equal emphasis on these two variables at Train to Train, a progressive increase in training at both Train to Compete 1 and Train to Compete 2, and a subsequent stabilization at both Train to Win 1 and Train to Win 2. Although Curling Canada's guidelines follow a similar progression, it is apparent that they place a greater emphasis on training at virtually all stages than was found to be the case with the current study's participants. However, Curling Canada's guidelines are certainly much closer to these curlers' experiences than are the generic ones put forward by Canadian Sport for Life, which get increasingly inaccurate as the stages progress. Therefore, although certain adjustments may still be advised, these curlers' histories validate Curling Canada's decision to veer from the generic training to competition ratios established by Balyi et al. (2005) and carried forward by Canadian Sport for Life (2014).

Conclusions and Recommendations

This study has carefully examined the career histories of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen in order to better understand the attainment and refinement of their elite-level curling expertise. In the process it has identified several key similarities and differences in their developmental activities and experiences. In terms of similarities, it is noteworthy that each of these curlers achieved five key competitive milestones (i.e., their first pre-men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded men's major title) over the course of their careers. With this in mind, their ages and experience levels at each of these milestones might be seen as general benchmarks for those who aspire to comparable competitive success.

Another key similarity among the curlers in this study is that they all dedicated considerable time and energy to the ongoing development of The Five Components of Curling Expertise (i.e., technical, tactical, physical, mental, and social). While this does not mean that all five of these components received equal attention during every stage of these curlers' careers, each obviously ended up being developed sufficiently to progress from one competitive milestone to the next. Consequently, the various qualitative themes that these curlers shared might be seen as logical starting points for guiding the next generation of aspiring elite curlers.

For example, the fact that all four curlers in this study had a junior coach who had a lasting technical impact, positive or otherwise, suggests that the sport needs to ensure that it has a sufficient number of capable coaches to meet the needs of its young prospects at least. With this said, such an effort might also take some of the burden off of teammates in

supporting curlers in their early men's careers, without necessarily replacing their technical contributions altogether. In addition, the presence of more and higher quality technical coaches could help experienced elite curlers to make the best possible adjustments to their technical training, and in so doing to further enhance this component of their expertise.

From a tactical perspective, there could be value in using carefully selected video clips to better illustrate some of the subtitles of different game situations. This aligns with the fact that all four curlers in this study did a good amount of their early tactical learning by watching games involving elite curlers, and considering the extensive use of video in other sports, could end up being a more efficient and effective approach. This in turn would better prepare curlers for the tactical demands of competition, without hindering the direct tactical learning appears to occur in that environment. The net result could be better tactical skills at a younger age, and potentially an earlier opportunity to share tactical understandings among team members.

As for the physical component, it is clear that all four curlers in this study believed that they had natural athletic abilities that not only helped them in curling, but in their other sports as well. At the same time, it seems probable that their involvement and success in other sports also enhanced their overall athleticism, and as such might be seen as a direct contributor to this component of their curling expertise. With this and other benefits in mind, developing curlers should be encouraged to continue competing in an off-season sport during mid to late adolescence. Furthermore, they should be given access to professional fitness coaching during this same timeframe, as this would help to ensure that they are engaged in appropriate forms of physical training before initiating

their men's careers.

Moving on to the mental component, the results of this study confirm that all four curlers actively worked on their mental skills through various self-directed activities during their junior years, and later sought out external support from a mental trainer. To this end, and along the lines of what was suggested on the physical side, there could be merit in finding ways for curlers to get professional mental coaching during adolescence, and thereby ensuring that they have a sound approach from the start. However, no matter how they get there, the key for aspiring elite curlers may well be to develop the same type of improvement-oriented mindset that the curlers in this study displayed. Such a mindset would help curlers to bounce back from the inevitable setbacks they will face, and thereby to remain engaged in their ongoing development.

Finally, as it relates to the social component of curling expertise, it is clear these curlers felt that their evolving interpersonal skills benefited them at various points in their careers. With this in mind, there may be merit in finding ways to teach these skills in a more structured manner, as opposed to relying exclusively on the informal learning that this study's curlers experienced. This is not to suggest that informal social learning should not continue to occur, or that there may not be important benefits associated with it. However, given the key role that enhanced social expertise can play in building strong team dynamics, anything that would expedite a curler's learning would seemingly be a worthwhile investment.

Without diminishing the similarities that existed among the four curlers in this study, or the important lessons that might be taken from them, it must be recognized that each curler also followed his own distinct pathway. This is apparent from the sizable

ranges that exist with respect to their investments in different types of training and competition. Although these ranges may be particularly apparent due to this study's small sample size, it is safe to say that no two curlers took the same approach to their development at any point in their careers. With this in mind, the average investments that this study has calculated for any category of training or competition should not be treated as definitive targets.

Furthermore, each curler's career should be looked upon as a unique journey, which has shaped him in any number of ways. For example, Brad Gushue's history is unique in that he was the only curler to get started in the sport after childhood. However, this later start may well have been the main impetus behind the dogged work ethic that in many ways has been the defining feature of his career. Gushue was well aware that his late start put him behind his competitors, and was determined to make up for lost time. In fact, he was so determined that he ended up making by far the largest developmental investments of any curler in this study.

Marc Kennedy's career history is unique in that he is the only curler coached by a parent, or to have a sibling as a teammate. Kennedy's junior curling years were very much a family affair, and it is clear from his comments that this situation affected both positively and negatively. On the one hand, the positive role modeling and supportive team environment brought about by this situation may have accelerated the development of the social component of his expertise. However, on the other hand, the development of the technical component appears to have been hindered by his father's limited technical knowledge, which is something that Kennedy had to make up for later on.

Brent Laing's career history is unique in that he was the only curler to grow up in a small town, where the curling club was very much a social hub of the community. This might help to explain why Laing valued his relationships with club members, coaches, teammates, and opponents as much as he did, and why the social component of his expertise was seemingly so well developed at a young age. With this said, his small town upbringing might also help to explain why his first trip to the Canadian Juniors did not come until age-19, and why he needed to team up with curlers from other parts of Ontario in order to get there.

Finally, Nolan Thiessen's career history is unique in that he was the only curler to initially choose another sport as his main one. Thiessen makes no secret of the fact that baseball had always been his priority, which is why he jumped at the chance to play baseball in the United States. He therefore stepped away from curling for the better part of two seasons, and in the process to fall well behind his curling peers. This might help to explain why it took Thiessen until age-27 to break through to the elite level of the sport, and why he had such a difficult time finding a truly competitive team for the first few years of his men's career.

These differences notwithstanding, this study makes three main contributions to the academic literature. First, it is the only known study to break expertise down in a sport-specific manner (i.e., The Five Components of Curling Expertise). Although the technical, tactical, physical, and mental components were not especially surprising since specific questions were asked about them, the emergence of the social component was unexpected. Defined as a curler's interpersonal capabilities with teammates and coaches, the social component of curling expertise effectively serves as an individual's capacity to positively

influence team dynamics. Given that all four curlers cited strong team dynamics as integral to their teams' success, the importance of this social component should not be underestimated. With this in mind, and recognizing that the value of strong team dynamics is by no means exclusive to curling, researchers may wish to examine the development and impact of athletes' social skills in other sport settings.

The second contribution that this study makes to the academic literature is related to the development of each component of their curling expertise, and specifically to the contribution of different types of training and competition to that development. For example, it is clear from all four curlers' histories that the technical, physical, and mental components were the product of the corresponding type of training. On the other hand, it is also clear that competition experiences, rather than tactical training, was seen by these curlers as the key contributor to the development of the tactical component of their expertise. Similarly, although it was likely developed through a wide range of interactions with teammates and/or coaches, these curlers' comments suggest that the competition environment was quite important to the development of the social component of their expertise. Therefore, although Ericsson et al. (1993) did not see competition as playing a significant developmental role, the results of this study seem to suggest otherwise.

Finally, this study also contributes to the academic literature in that it is one of only two known studies to have examined the career-long development of all components of elite-level athletic expertise in Olympic and/or World Champions. With this said, the other was a purely qualitative inquiry by Durand-Bush and Salmela (2002) that included athletes from a wide range of sports. Therefore, the current study is unique in that it has produced both qualitative and quantitative data, and focused on athletes from a single sport. This

approach helped to generate a greater breadth and depth of data, and has led to meaningful new insight. For example, in terms of the attainment of their expertise, the current study confirmed that its athletes took part in technical, tactical, physical, and mental training just as those examined by Durand-Bush and Salmela did, and offered athlete perspectives on the specific contributions of these types of training, along with their proportional investments in them. Furthermore, like the athletes in the Durand-Bush and Salmela study, those in the current study also used competitions as opportunities to test their skills and progress, especially when they were in their late teens and early 20's.

With this said, the current study also offered insight into the later years of its' curlers' careers, including after they won their first Olympic or World Championship gold medal (i.e., during Period 3). To this end, like the athletes examined by Durand-Bush and Salmela, these curlers continued to take part in all types of training (i.e., technical, tactical, physical, and mental), and through experience became increasingly comfortable in major competitions. Furthermore, as part of their commitments to continuous improvement, these curlers also embraced creativity and innovation in a meaningful way. However, unlike the athletes in the Durand-Bush and Salmela study, none of these curlers study emphasized rest and regeneration any more at this point in their careers than they did previously, and based on their comments, may have actually worked harder.

Significantly, Durand-Bush and Salmela (2002) used their athletes' first Olympic or World Championship gold medals as the threshold for the final stage of their careers. However, since this is an extremely high standard that effectively aligns with *world-leading expertise*, the current study elected to use a more generalizable standard. More specifically, recognizing that it is a clear indication of elite-level success, each curler's first men's major

title was used as confirmation of the attainment of *elite-level expertise*, and considered all developmental activities and experiences that followed it to be part of its refinement. This aligns with the Gulbin et al. (2013), who argued that there are different levels of elite athletic performance (e.g., senior elite success vs. sustained success or mastery), and recognizes that elite athletes' expertise continues to evolve even after they have achieved expert status.

This study is not without its limitations, however, beginning with the fact that most of its data were generated through retrospective interviews, and were therefore affected by the realities of imperfect recall. Furthermore, considering that these curlers' careers have lasted well over two decades, and that curling has evolved considerably in that time, their career experiences may not be entirely relevant to today's developmental landscape. Another key limitation is related to this study's small sample size, which meant that its quantitative data had no real explanatory power and could only be used to enhance the description of these curlers' histories. Finally, this study is also limited by the fact that its sample only included international champions, and therefore offered no opportunity for comparison to less successful curlers.

Future research could address many of these limitations through a combined cross-sectional and longitudinal design similar to the one used in companion studies by Ward et al. (2007) and Ford et al. (2009). Such a design would begin with the collection of data related to the recent developmental activities and experiences of sufficiently large populations of male and female curlers to allow for meaningful cross-sectional analysis. Then, approximately three-years later, when it was clear which curlers had advanced to the next level, and which had not, the initial data would be re-analyzed to identify the key

similarities and differences among these curlers. This design would enhance the reliability of the data collected, would allow for comparisons between more vs. less successful curlers, and would produce results that are fully relevant to contemporary programming.

This type of an approach would allow researchers to focus on selected personal, contextual, and process factors that might affect the ongoing development of curling expertise. In terms of process factors, there could be merit in putting curlers through a battery of tests that would assess their physical and mental characteristics, including their athleticism and mindset. In terms of contextual factors, there could be merit in clarifying the contribution of teammates and coaches on the various components of curlers' expertise. Finally, in terms process factors, there could be merit in having curlers and coaches keep logs that would quantify their investments in different types of training and competition, and would capture their perspectives about how each might have contributed to the various components of their evolving expertise.

However, no matter what direction future research takes, the results of this study have important practical implications for curling coaches and administrators. More specifically, the proven pathways of the four curlers who have taken part offer a useful roadmap for anyone involved in guiding the champions of the future. In particular, the period-by-period qualitative themes that these curlers shared as they were attaining and refining the various components of their expertise might help to shape the design and delivery of curler development programs. Furthermore, its quantitative data might be used to establish general benchmarks to assess curlers' competitive progressions, and to guide the volume of different types of training and competition. With this said, coaches and administrators should also keep in mind that no two curlers in this study followed the

same pathway, and therefore must allow for individual differences in the developmental programming that they put in place.

In the end, regardless of whether one's perspective is practical or theoretical, there is a common interest in finding the most efficient and effective way to attain and refine elite-level curling expertise, and ideally to facilitate world-leading performances. However, rather than being focused on a particular destination, these curlers' stories are reflective of an everyday journey towards mastery. Brent Laing's words capture the spirit of this journey perfectly, and in many respects encompass what all four curlers have taught us over the course of this study:

Its a sport that you'll never master. You can call yourself a master, but there's always something you can get better at. (Appendix F, p. 260)

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Appendix A: Qualitative Interview Guide

The questions below guided the Qualitative Interviews that were conducted in this study. However, as per the guidelines associated with Life Story Interviews (Atkinson, 1998), depending on the extent to which the participant is 'holding the floor', some of these questions might not have been used.

(Please note that this Qualitative Interview took place approximately one week after a Quantitative Interview had been completed. See Appendix C for more information about this Quantitative Interview).

Informed Consent

Once again, thanks for agreeing to take part in this research project. Also, I just wanted to re-confirm that you understand that that by taking part both your identity and your curling life story will be known to the public. *(Await verbal response).*

Period 1: Starting Curling to End of Juniors

I'd like start by getting a feeling for a variety of foundational aspects of your development of a curler, specifically during your junior years. As I ask you these questions I'd like you to consider the full span of your junior years, beginning when you first started curling and ending when you were about to start your men's career.

Tell me a little bit about what it was like growing up in (insert name of hometown)?
(Identified during Quantitative Interview).

In our last interview you mentioned that you played several other sports growing up (list), what was the relative importance of these sports to you during your junior curling years?

In general, how quickly did you pick up the skills associated with these sports? How did you feel that your skills compared to those of your teammates and opponents?

What was your primary motivation for getting involved in curling? And, what motivated you to stay involved over the course of your junior (and university) career?

Did any of your parents and/or siblings curl at that time? What sort of a role did these family members play in your curling during these years?

In our last interview you mentioned that you played at the (insert club name) when you were a junior? Can you describe what your junior experience was like there?

Thinking back to the various teams that you were part of in juniors (and university), are there any teammates who stand out as being quite influential? What did you learn from them?

What about the various coaches that you had in juniors (and university), are there any who stand out? What sort of a contribution did they make to your development?

Can you think of the things that you did during juniors that helped to develop your technical skills (i.e., delivery/brushing technique and shot-making)? (Probe: Both Practices and Games).

What about your tactical understanding (i.e., decision-making before & during a shot), what did you do to develop these types of skills at that time? (Probe: Both Practices and Games).

What did you do during these years that contributed to your physical development (i.e., fitness, athleticism, etc.)? (Probe: Fitness Training, Other Sports, etc.).

What about your mental skills (i.e., concentration, competitiveness, etc.), what types of things did you do that helped to develop them? (Probe: Mental Training, Curling on TV, etc.).

In your opinion, what were the biggest accomplishments during your junior career? Looking back, how did these accomplishments contribute to your future success?

Last time we established that you were also very successful in University curling. Can you walk me through that experience, and what it meant to your development? (If applicable)

Period 2: Start of Men's to First Men's International Title

Now I'd like to move on to examine many of these same considerations at a little later stage of your career. More specifically, as I ask you the next series of questions I'd like you to consider the years from when you aged out of Juniors, up to and including your first Team Canada experience at the Men's level, which in your case was at the (insert year) Worlds/Olympics.

Although curling was now your main sport, you mentioned that you were still involved in other sports (list). What was the nature of your involvement in these sports at that time?

How did the role of your parents and other family members change from your junior (and university years? Was there anyone new in your support system (e.g. significant other)?

How did you manage to fit post-secondary education in? You mentioned that you went to (insert university/college name), what did life look like for you then?

What about after you graduated, and the transition into the work world? Did you have to make compromises and/or sacrifices here to be able to pursue your curling?

What curling club(s) did you belong to during this period? Were you involved in any leagues or programs there, or was it now more of a practice venue?

What were the various teams that you were part of during this period? Were there any teammates who stood out as being particularly influential, and if so who and how?

What about the coaches that you had during this period? What sort of a contribution did they make to your ongoing development?

To what extent did you assume personal responsibility for your development as a curler at this time? How did this fit in with the role played by others (i.e., coaches and teammates)?

Can you think of the things that you did at that time that helped to develop your technical skills (i.e., delivery/brushing technique and shot-making)? (Probe: Both Practices and Games).

What about your tactical understanding (i.e., decision-making before & during a shot), what were you doing to develop these skills? (Probe: Both Practices and Games).

What did you do during this period that contributed to your physical development (i.e., fitness, health, etc.)? (Probe: Fitness Training, Health Providers, etc.).

How about your mental skills (i.e., concentration, competitiveness, etc.) what were you doing at that time to develop them? (Probe: Mental Training, Curling on TV, etc.).

What was it like to represent Canada at your first Worlds/Olympics (name year and event)?

Looking back, how did that experience influence where you are today?

Period 3: After First Men's International Title to 2014-15 Season

Finally, I'd like to move into the 'current' stage of your career. This time, as I ask you the last series of questions, I'd like you to consider the years after your first men's Team Canada experience, right up until the present day. So, from (insert year after first Worlds or Olympics) right up to the 2014-2015 season.

It's been (insert number) years since the (insert year and event), and a lot has happened in that time, (including playing for Canada ____ more Worlds/Olympics if applicable). Overall, how do you feel you have evolved as a curler during this period?

Outside of curling, you mentioned that you were still involved in (list sports) during this period? What has been the nature of your involvement in these sports?

Thinking about your family, which now includes (name wife, children, etc.), what type of a role would you say that they have they played during this period?

What about your work life, how has it evolved over the years? How have you managed to find the right balance between work and curling during this period?

What curling club(s) have you belonged to during this period? Have you been involved in any leagues or programs there, or does it serve as more of a practice venue?

What were the various teams that you have been part of during this period? Are there any teammates who stand out as being particularly influential, and if so who and how?

What about the coach(s) that you've had in this period, who has been most involved? Have your expectations changed over the years, and what role do coaches play with you today?

To what extent have you assumed personal responsibility for your ongoing development? And how has this evolved, as compared to that of coaches and teammates, during this period?

What have you done during this period, and up to today, to continue to develop your technical skills (i.e., delivery/brushing technique and shot-making)? (Probe: Both Practices and Games).

What about your tactical understanding (i.e., decision-making before and during a shot), how have you developed it during this period? (Probe: Both Practices and Games).

What have you done during this period that has contributed to your physical development (i.e., fitness, athleticism, etc.)? (Probe: Fitness Training, Health Providers, etc.)

What about your mental skills (i.e., concentration, competitiveness, etc.) what have you done during this period to develop them? (Probe: Mental Training, Curling on TV, etc.).

Looking back over the course of your full career, what aspects do you feel have been most important in your development and evolution into the curler that you are today?

Looking forward, how much longer do you see yourself playing at the elite level? And, what are your main goals for the rest of your career?

Appendix B: Qualitative Data Analysis

As summarized in Table B.1, the qualitative data analysis process in this study generated 571 *meaning units*, 11 *dimensions*, and five *categories*. As this table indicates, four of these dimensions (i.e., Competition Experiences, Other Sports, Family Relationships, and Life Considerations) were not included in the final five categories, since none were seen as being directly applicable to answering the stated research question. However, the remaining seven dimensions were found to assist in determining how the four champions who took part in this study developed their elite-level curling expertise. With this fundamental requirement in mind, these seven dimensions came together to form the final five categories, which have been labeled ‘The Five Components of Curling Expertise’.

Table B.1
Qualitative Meaning Units, Dimensions, and Categories

Classification	Quantity	Details
Meaning Units	578	Period 1 (199) + Period 2 (203) + Period (175) = 578 Brad Gushue (121) + Marc Kennedy (144) + Brent Laing (162) + Nolan Thiessen (151) = 578
Dimensions	11	Technical Expertise, Tactical Expertise, Physical Expertise, Mental Expertise, Personal Mindset, Teammate Relationships, Coach Relationships, Competition Experiences, Other Sports, Family Relationships, Life Considerations
Categories	5	Technical Expertise, Tactical Expertise, Physical Expertise, Mental Expertise (incorporates Personal Mindset), Social Expertise (combines Teammate Relationships and Coach Relationships)

Note. All Meaning Units were drawn from the Curling Life Stories of Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen. These Curling Life Stories can be accessed at www.curlinglifestories.ca

As it relates to the four dimensions that were not included in the final five categories, two (i.e., Family Relationships and Life Considerations) were found to be sufficiently separate from this study's research question that they were excluded from the results altogether. By contrast, the other two (i.e., Competition Experiences and Other Sports) were instead seen as complementary dimensions, and were therefore incorporated in a supporting manner.

To clarify, it quickly became apparent that Competition Experiences formed an essential framework for each curler's Developmental History (see Appendices D-G), and for the brief Curler Profiles that appear at the beginning of Chapter 4. For its part, the Other Sports dimension was found to have provided these curlers with significant general athletic opportunities and experiences, and it was therefore determined that it warranted a dedicated section later in Chapter 4.

As for The Five Components of Curling Expertise, four began as dimensions of their own, while the fifth (i.e., Social Expertise) represented the amalgamation of two other dimensions (i.e., Teammate Interactions and Coach Interactions). This amalgamation provides a useful example of the initial steps in the qualitative data analysis process used in this study, and forms the basis for Table B.2. As you will notice, this table focuses exclusively on Period 1 of these curlers histories, which by definition spans the start of their curling careers to the end of their junior eligibility. As you will also notice, meaning units from all four study participants (i.e., Brad Gushue, Marc Kennedy, Brent Laing, and Nolan Thiessen) have been included.

Table B.2

All Meaning Units and Dimensions for the 'Social Expertise' Category – Period 1

Meaning Units (27)	Dimensions (2)
BG 20 = Recruits and Becomes Friends with Junior Third	Teammate Relationships
BG 21 = Impressed with Junior Third's Work Ethic	Teammate Relationships
BG 26 = Impressed with Junior Coach's Commitment	Coach Relationships
MK 3 = Brother Started Curling at Same Time	Teammate Relationships
MK 13 = Felt He Was a Socially Awkward Kid	Teammate Relationships
MK 20 = He and Brother Have Contrasting Temperaments	Teammate Relationships
MK 31 = Brother's Injury Leads to Separate Paths	Teammate Relationships
MK 44 = Universiade Teammate Provides Players' Sparing Gig	Teammate Relationships
MK 45 = Sparing Gig Leads to First Men's Team Opportunity	Teammate Relationships
MK 2 = Dad Was His First and Only Junior Coach	Coach Relationships
MK 21 = Coach/Dad Attempts to Manage Expectations	Coach Relationships
MK 24 = Coach/Dad Helps to Analyze Performance Gaps	Coach Relationships
BL 1 = Grew Up Playing All Sports with Junior Second	Teammate Relationships
BL 13 = Enjoyed Small Team Dynamic in Curling	Teammate Relationships
BL 15 = Prefers Team Sports Over Individual Sports	Teammate Relationships
BL 52 = 18 Years of Shared Experiences with Junior Third	Teammate Relationships
BL 53 = Junior Skip Brings Killer Instinct and Swagger	Teammate Relationships
BL 54 = Swagger Contrasts with His Small Town Values	Teammate Relationships
BL 10 = Junior Second's Dad was Their First Curling Coach	Coach Relationships
BL 36 = Co-Coaching Situation for '98 Championship Year	Coach Relationships
BL 39 = New Coach Steps in as Neutral Leader in '99	Coach Relationships
BL 40 = Potential Dynamics Issues with Co-Coaches/Dads	Coach Relationships
NT 44 = Unique Dynamic with Junior Skip	Teammate Relationships
NT 45 = Notes That Junior Skip was 'All Curling'	Teammate Relationships
NT 47 = Notes Importance of Team Cohesiveness	Teammate Relationships
NT 49 = Didn't Agree With '01 Junior Coach's Methods	Coach Relationships
NT 51 = '01 Junior Coach His First Real Curling Coach	Coach Relationships

Note. All Meaning Units have been coded based on each study participant's initials and the chronological order that they appeared within their Curling Life Stories. These Curling Life Stories can be accessed at <http://www.curlinglifestories.ca>

With these initial steps complete, the rest of qualitative data analysis process began with a careful comparison of the various meaning units associated with a given category until one or more coherent themes emerged for a particular career period. Continuing the above example, Table B.3 identifies the theme that emerged within the Social Expertise category for Period 1, along with the five meaning units that were used to generate that theme. To clarify, because this study focused only on true commonalities, all themes needed to draw on at least one meaning unit from each curler's history. With this stipulation in mind, it was typical for only one category-specific theme to emerge for a given period. However, in those instances where more than one emerged, the theme considered most relevant to the study's aims was selected.

Table B.3

Theme, Related Meaning Units, and Dimensions for the 'Social Expertise' Category – Period 1

<u>Theme: all curlers developed strong relationships a junior teammate that set the stage for future team interactions</u>	
Related Meaning Units (5)	Dimensions (2)
BG 20 = Recruits and Becomes Friends with Junior Third	Teammate Relationships
BG 21 = Impressed with Junior Third's Work Ethic	Teammate Relationships
MK 20 = He and Brother Have Contrasting Temperaments	Teammate Relationships
BL 52 = 18 Years of Shared Experiences with Junior Third	Teammate Relationships
NT 44 = Unique Dynamic with Junior Skip	Teammate Relationships

It should be noted that once the category-specific theme for each period was confirmed, corresponding quotes drawn from all four curlers' histories were used to enhance its description. Each of these quotes was introduced so as to provide the necessary context and to identify relevant connections to the established theme. Finally, given that this study was concerned with ongoing development of elite-level curling

expertise over the course of their full careers, this same process was followed for each career period and for each of the five categories that emerged from this study.

With the qualitative data analysis process now fully described, this appendix will conclude by clarifying the inclusion criteria for each of The Five Components of Curling Expertise. Table B.4 provides a summary of these inclusion criteria, which have been closely adhered to both in identifying the meaning units that should sit in each category, and in developing the period-by-period themes associated with them. It is believed that, like the data analysis process itself, this approach has helped to ensure a high degree of qualitative rigor in this study.

Table B.4

Inclusion Criteria for The Five Components of Curling Expertise

Component	Inclusion Criteria
Technical Expertise	A curler's delivery, shot-making, and personal sweeping capabilities
Tactical Expertise	A curler's pre-shot and in-shot decision-making capabilities
Physical Expertise	A curler's physiological and motor capabilities
Mental Expertise	A curler's psychological capabilities and personal mindset
Social Expertise	A curler's interpersonal capabilities with teammates and coaches

Appendix C: Quantitative Interview Guide

The questions below guided the Quantitative Interviews that were conducted in this study. Although certain modifications were to suit the specific purpose of the current study, the questions that follow are still quite consistent with the interview procedure that was put forward by Côté et al. (2005).

(Please note that this Quantitative Interview was completed approximately one week before a Qualitative Interview took place. See Appendix A for more information about this Qualitative Interview).

Informed Consent

First of all, I'd like to thank you for agreeing to take part in this research project. I also wanted to confirm that you understand that that by taking part both your identity and your curling life story will be known to the public. *(Await verbal response).*

Background Information

The idea behind this project is to better inform our developmental efforts with future generations of aspiring elite curlers. This first set of questions is designed to get at some basic background information that will help to set the stage for the rest of the study.

What was your hometown as you were growing up? Did your family make any major moves either when you were a child or a teenager?

Can you tell me the names and locations of the elementary school(s), junior high school(s), and high school(s) that you went to?

Did you go to college or university, and if so did you start right after high school? What was the name and location of the institution(s)? What degree(s) or diploma(s) did you receive?

What is your current occupation? What company or organization do you work for? Can you give me a basic overview of your career progression to date?

What is your current marital status (single, married, divorced)? Do you have a significant other (name, time together, etc.)? Do you have kids (names, ages, live with you, etc.)?

How old were you when you first started to curl? What was your home curling club at that point in time? (Note: use this information to begin Chart 2)

Outside of curling, what other organized sports did you play when you were growing up, even if it was just for one season (list all sports)?

Of these sports, which if any did you compete in at the Provincial Junior level or beyond (list all sports)? (Note: use this information to begin Charts 1B, 1C, etc.)

Finally, did you encounter any major injuries, illnesses, or other circumstances that kept you away from sports for at least 6 weeks? (Note: use when completing Charts 2, 3A and 3B)

Developmental Milestones: Curling (Chart 1A)

Now, I'd like to delve into your curling background, and in particular to get a sense of how old you were when you first reached a variety of different Curling milestones. We'll start with a number of different competition-related milestones, and will then try to determine the timing of certain training milestones as well.

We're going to do this by completing the following chart together (researcher brings Chart 1A up on the screen). Now, it might look like a lot of information at first, but its really pretty straightforward. Also, because some of this information was available online, I've filled in everything that I could, but I'll still need you to verify to ensure that I've got things right. I've also put together a little quick reference sheet, so it's easy to figure out how old you were in a given season. Okay, let's get started (proceed with completing Chart 1A).

Developmental Milestones: Other Competitive Sports (Charts 1B, etc.)

A few minutes ago you noted that you had also reached a reasonably high competitive level in (list all sports where the athlete reached at least the Provincial Junior competition). As we just did with curling, I need to get a sense of when you reached certain key milestones in each of these sports as well. Of these sports, which would you say that you reached the highest competitive level in?

Great, let's start with (insert sport just mentioned) then, and let's fill in the same types of things that we did for curling (researcher brings Chart 1B up on the screen). Again, you might find my little quick reference sheet helpful, so you know right away how old you were in a given year. Okay, let's get started (proceed with completing Chart 1B)...

Note: the researcher then goes through the same procedure with each other Competitive Sport identified, completing Charts 1C, 1D, 1E, etc. (not included) as required.

Developmental Investment: Main Sport - Curling (Chart 2)

Okay, now that we've identified the timing of various developmental milestones both in curling, and in your other competitive sports, I'd like to get a sense of how much time you

invested at different ages and stages of your sporting career. Let's begin with Curling (researcher brings Chart 2 up on the screen).

As you can see, this chart divides your curling career into distinct 3-year time windows. Now, I recognize that some of these windows happened many years ago, and it could be a little difficult to remember the fine details as to what your involvement looked like back then. Don't worry too much about that, because it's a basic reality of all retrospective research.

For each time window we really only need to answer two basic questions: 1) how many hours would you estimate that you spent on various curling activities during a typical week? and, 2) how many weeks would you estimate that your curling season typically lasted during that particular time window? Again, I'm just looking for your best estimates here, I understand that it won't be perfectly accurate (proceed with completing Chart 2 in reverse chronological order)...

Developmental Investment: Other Competitive Sports (Chart 3A)

Now, we're going to go through a shorter version of the same procedure for each of the other sports that we identified where you competed at the provincial level or beyond (researcher brings Chart 3A up on the screen). As we did with curling, for each of time window I'm just going to ask you to estimate the number of hours that you invested in a typical week, and how many weeks that this typically lasted over the course of the year. Let's get started (proceed with completing Chart 3A in reverse chronological order)...

Developmental Investment: Additional Sporting Involvement (Chart 3B)

I've got some good news - we've reached our final chart (researcher brings Chart 3B up on the screen). This one is intended to capture any time investment that we might have missed as we completed the last two charts. As you can see, it includes the various other sports that you played where you didn't reach the provincial level (list specific sports identified in the Background Information section). It also includes certain General Training activities that you might have done to prepare for the various sports you were involved in.

Once again, for each of time window I'm just going to ask you to estimate the number of hours that you invested in a typical week, and how many weeks this typically lasted over the course of the year. Let's get started (proceed with completing Chart 3B in reverse chronological order)...

Chart 1A

Developmental Milestones by Age – Main Sport (Curling)

First Involvement>	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pre-Adult Competition																									
Local																									
District																									
Provincial																									
Semi-National																									
National																									
International																									
Other (Canada Games)																									
Adult Competition																									
Local																									
District																									
Provincial																									
National																									
International																									
Other (Grand Slam)																									
Other (Canada Cup)																									
Other (Olympic Trials)																									
Training Activities																									
Technical																									
Tactical																									
Physical																									
Mental																									
PSO Program																									
University/College																									
La Releve																									
National Team																									

Note: Based on their international success, it is reasonable to assume that all participants would consider Curling to be their Main Sport.

Chart 1B

Developmental Milestones by Age – Other Competitive Sport #1

First Involvement>	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pre-Adult Competition																									
Local																									
District																									
Provincial																									
Semi-National																									
National																									
International																									
Other (Specify)																									
Adult Competition																									
Local																									
District																									
Provincial																									
Semi-National																									
National																									
International																									
Other (Specify)																									
Training Activities																									
Technical																									
Tactical																									
Physical																									
Mental																									
PSO Program																									
University/College																									
NSO Program																									

Note: Beyond Curling, the sport for which the participant reports the next highest level of competitive success (minimum: Pre-Adult Provincial).

Chart 2

Developmental Investment in Hours – Main Sport (Curling)

Developmental Stages >	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	33-35	Cumulative
Curling Competition											
Competition (League)											
Competition (Event)											
Competition (Total)											
Curling Training											
Training (Technical)											
Training (Tactical)											
Training (Total)											
Combined Curling											
Competition (Aggregate)											
Training (Aggregate)											
Overall (Aggregate)											

Note: Curling Competition is broken down into League and Event, while Curling Training is broken down into Technical and Tactical.

Chart 3A

Developmental Investment in Hours – Other Sports (Competitive)

Developmental Stages >	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	33-35	Cumulative
Competitive Sport #1											
Competition (Total)											
Training (Total)											
Combined (Total)											
Competitive Sport #1											
Competition (Total)											
Training (Total)											
Combined (Total)											
Combined Competitive											
Competition (Aggregate)											
Training (Aggregate)											
Overall (Aggregate)											

Note: Complete for each sport for which the participant reports competitive involvement that is at least at the Pre-Adult Provincial level.

Chart 3B

Developmental Investment in Hours – Additional Sporting Involvement

Developmental Stages >	6-8	9-11	12-14	15-17	18-20	21-23	24-26	27-29	30-32	33-35	Cumulative
Non-Competitive Sports											
Competition (Total)											
Training (Total)											
Combined (Total)											
General Training											
Physical (Total)											
Mental (Total)											
Combined (Total)											
Combined Additional											
Non-Competitive (Aggregate)											
General Training (Aggregate)											
Overall (Aggregate)											

Note: Complete as Aggregate Totals for all sporting involvement not classified as Competitive and for General Training (i.e., Physical and Mental)

Appendix D: Brad Gushue's Career History

Brad Gushue is without question the most successful curler ever to play for Newfoundland and Labrador. As of the end of the 2014-15 season, Gushue had represented the province in 18 National Championships, including a record six Canadian Juniors and a record 12 Briers. He also had three Grand Slam titles to his credit, and has remained in the top-10 on the Canadian Team Ranking System (CTRS) since it was established in 2006-07. However, the highlight of Gushue's career to date was the gold medal that he won at the 2006 Olympic Winter Games in Torino, Italy. This puts him in a group of three Canadian men's Skips to ever accomplish that feat. A complete record of Gushue's competitive accomplishments has been included at the end of this history (see Tables D.13 and D.14).

Gushue was born in St. John's, Newfoundland on June 20, 1980, and grew up in the neighbouring community of Mount Pearl with his parents, Ray and Maureen, and his older sister Natasha. After graduating from O'Donnell High School, he went to Memorial University of Newfoundland where he earned his Bachelor of Business Administration degree in 2004. After graduation Gushue then worked in the financial advisory industry for a few years, but then determined that it did not suit his interests or his extensive curling schedule. He therefore decided to become an entrepreneur and now owns two frozen yogurt stores, along with numerous real estate rental properties in the St. John's area. Gushue married his wife Krista in 2006. They currently live in St. John's with their two daughters, Haley and Marissa.

Note: All quotations in this history were drawn from Brad Gushue's Curling Life Story. Retrieved from <http://www.curlinglifestories.ca>.

Period 1: Start of Curling to End of Juniors

Gushue first became interested in curling at age-7, when he started watching the sport on television. “I just loved Brier and Scotties time of year”, he remembers. “My mom and I would sit down on the couch after I got home from school and we’d watch the afternoon draw, have something to eat, and then watch the night draw. I didn’t do any homework for two weeks.” However, it wasn’t until age-13 that Gushue actually began curling himself. He had heard an announcement at his school about a junior curling program at the St John’s Curling Club. So, Gushue convinced his mother to let him sign up for the program, and to drive him to the rink. “I quickly went from two days a week, probably the first half of that year, to when I got picked to play on this provincial team, and all of a sudden it was three and four days a week,” he notes. “Then the next year it was every day after school.”

This initial immersion in the sport ended up paying off immediately, as Gushue won his first Newfoundland and Labrador Junior Men’s Championship at age-14, playing Second for an older Skip, BG Teammate 1. However, after posting just a single win at the Canadian Juniors, BG Teammate 1 elected to put together a completely different line-up for the following season. So, Gushue took over the skipping duties on the team, and ended up winning his second consecutive provincial title. But, it was his subsequent trip to the Canadian Juniors that turned out to be quiet instrumental in his development as a curler. “I went out and played really well at Nationals, and at 15 I won All-Star Skip. I think I was 81 or 82% for the week,” Gushue recalls. “Really, I knew at that point that I could be one of the better players in the world.”

After a third trip to Nationals at age-17, Gushue convinced BG Teammate 2 to move from Labrador City to St. John's to play third on his junior team. This would prove to be a fruitful partnership for many years to come, although it produced considerable competitive success right from the start. Together Gushue and BG Teammate 2 would win bronze at the 1999 Canadian Juniors, and silver in 2000. This would set up some rather finite expectations in their final season of junior eligibility, expectations that led the two to seriously consider moving into men's competition ahead of schedule. "We were winning Super League and were winning a lot of the bigger bonspiels around the province," Gushue explains. "We probably would have won Provincials and gone to the Brier that year if we had joined." However, after some in-depth discussions with those around them, the team elected to complete their final season in juniors. "The only thing that could have made the year a success was to win the Canadian Juniors and the World Juniors," Gushue explains. "Then to pull it off, and to have the year we had, that was definitely something. I'm pretty proud of that accomplishment."

Based the many accomplishments that his teams achieved over the course of his junior years, and recognizing how pivotal the fourth-rock thrower is to any curling team's success, it is not at all surprising that Gushue managed to post some very impressive personal performances during this period. This is evident from Table D.1, which compares his shooting accuracy at the Canadian Juniors to the established positional standards from that event. It is noteworthy that Gushue posted the top shooting accuracy among the 13 Skips in the field in two of his six appearances at the Canadian Juniors, and was never out the top-four at that position. To clarify, the only time he ranked lower than fourth was at

his first Canadian Juniors, when he was in fact playing the Second position and was essentially still a rookie curler.

Table D.1

Brad Gushue's Shooting Accuracy at the Canadian Juniors vs. Positional Standards: Period 1

Age	Season	Gushue's Rank	Gushue's Accuracy	Position Best	Position Average
14	1994-95	10	65%	75%	70%
15	1995-96	1	81%	81%	74%
17	1997-98	4	76%	82%	73%
18	1998-99	T3	77%	82%	73%
19	1999-00	1	79%	79%	68%
20	2000-01	T3	76%	78%	71%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

There are many factors that might have contributed to Gushue's success during his junior years, but to his mind nothing was more important than hard work. "I learned early on that when you put in the time, you could definitely make big strides in how well you perform," he says in reference to both curling and his other sporting pursuits. "That taught me a lot." Gushue's considerable work ethic is readily apparent from Table D.2, which details the hours that he invested in different forms of curling-related training and competition before age-21. As this table indicates, he invested 4,700 training hours and 2,295 competition hours during Period 1, for a total of 6,995 combined hours.

Table D.2

Brad Gushue's Curling-Related Training and Competition Hours: Period 1

Period 1		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
13-14	200	0	0	0	300	150
15-17	825	300	0	600	450	315
18-20	675	510	750	840	450	630
Period 1	1,700	810	750	1,440	1,200	1,095

Note. Gushue invested 4,700 training hours and 2,295 competition hours, for a total of 6,995 curling-related hours during Period 1.

Although Gushue already understood the importance of a strong work ethic, it was also something that was reinforced by those around him, beginning with BG Teammate 2. “He had the same work ethic as me. We were at the rink the same amount of time. We were throwing the same amount of rocks,” he says. “I really felt that we were a team, kind of learning as we went.” BG Teammate 2’s level of effort and engagement was quite important to Gushue, and was considerably different from what he got from any of his other junior teammates. “All the teammates who I had previous to that, I had a lot that worked hard, but none that even came close to working as hard as I did,” he says. “So, when [BG Teammate 2] came down, we became pretty close, quick.”

Gushue is also quick to credit his junior coaches for their contributions, especially as it relates to his technical development. To this end, it appears that his main junior coach, BG Coach 1, played a particularly important role in the 1,700 technical training hours that he accumulated during this period. “[BG Coach 1] played a large part in that because he is so good technically, and has a pretty keen eye for stuff like that,” Gushue says. “He knows my delivery, and [BG Teammate 2’s] delivery, so well.” In fact, Gushue believes that the

work the did with BG Coach 1 during his junior years, combined with time that he devoted to technical practice, laid an important foundation for the rest of his career. "I got myself in a position where I was sliding out pretty square, each and every time," he says. "From that year to now, technically, my delivery hasn't changed too much, other than the fact I've lost a bit of flexibility. It hasn't changed too much in 20 years or so."

As it relates to his tactical development, as part the 810 tactical training hours that he accumulated during this period, Gushue notes curling observation played a key role in his development. "When I wasn't playing, I watched a lot," Gushue says. Watching guys on TV, back in the early '90's, guys like [list of Champion Skips], and all those guys. That's kind of how I learned the basic strategy." Then, as he began to play against local men's teams in his later junior years, he became more proactive with his tactical education "I also used to ask a lot of questions when I was younger," Gushue says. I talked to guys like [Local Skips] when I was growing up. Guys from Newfoundland who we'd see on Tour, and who'd had a reasonable amount of success."

In terms of his physical development, Gushue believes that he had a distinct advantage in the types of sports that he played. "Mainly, I just had really good hand-eye coordination. I think the sports that I excelled at really related to that," he says. I wouldn't consider myself to be real athletic in a speed way or a power way, those are definitely not things that I'm natural gifted at." Beyond assessing his athleticism, Gushue is also quite honest about the fact that he did not embrace fitness until his later junior years. This is confirmed by the fact that all of the 750 training hours that he accumulated in this area came between ages 18 and 20. "I was actually a bit of a chubby kid," Gushue notes.

“Physical training is something that came along later for me. I was 18 or 19 before I really started to get a little bit more, I don't want to say athletic, but athletic looking.”

As far as his mental development is concerned, Gushue indicates that most of the 1,440 mental training hours that he accumulated during this period were focused on personal reflection and self-study. “I read a couple of Dr. Bob Rotella's books. He talked about picking small targets and things like that,” he explains. “I started to bring that into curling a little bit, probably when I was 17 or 18.” However, the main impetus to his mental training came when he missed a relatively straightforward draw on his last shot to lose the final game of the Canadian Juniors. In the wake of that loss, and that miss, Team Gushue started working with [BG Mental Trainer 1], a sport psychologist at Memorial University. “I knew that I needed to make some changes and work on it, so, we got [BG Mental Trainer 1] with us,” he says. “We made a ton of changes that first year, and worked really hard from the mental standpoint. From April of the year we started, right up until we won the World Juniors the following March, we were at it every day for half hour to an hour at least.”

Beyond his extensive involvement in curling, Gushue was also active in a number of other sports during this period including hockey, soccer, and volleyball. However, the two other sports for which he showed the greatest interest and aptitude were baseball and golf. It is noteworthy that Gushue represented his province on several occasions in both of these sports, and that he spent an enormous amount of time and energy on each during this period of his career.

This latter reality is evident from Table D.3, which summarizes the training and competition hours he invested in all sports other than curling before age-21. As this table

shows, Gushue invested a total of 9,979 hours in other sports during Period 1. It should be noted that this total is considerably more than the 6,995 curling-related hours that he accumulated during this same period, which is indicative of the importance he gave to other sports during these early years of his career.

Table D.3

Brad Gushue's Other Sports Training and Competition Hours: Period 1

Sports > Ages	Provincial & National (Baseball, Golf)		Local (Hockey, Soccer, Volleyball, Other)	
	Training	Competition	Training	Competition
6-8	0	0	135	270
9-11	260	400	135	270
12-14	780	2,280	204	405
15-17	660	2,080	0	0
18-20	420	1,680	0	0
Period 1	2,120	6,440	474	945

Note. Gushue invested a total of 9,979 other sport hours during Period 1.

Gushue began playing baseball at age-8, and began showing a high skill level in short order. "From the time I was 11, I always played two divisions up. So, I'd play my own division, the next division up, and the one above that," he recalls. "I was always on three teams." With all this in mind, it is not at all surprising that he was selected to play on the provincial team each year between ages 11 and 15. However, in this same time frame Gushue also developed a passion for golf, and by the time he reached age-13 he was playing at the provincial level in that sport as well. But, once he reached age-15, he felt that he needed to make a decision, "I kind of said, 'Okay, I can't get much better at both of these at the same time. I can improve at one, but I've got to spend a more time at one than the other,'" he notes. "That's when I decided to choose golf over baseball."

It was after this decision that his golf career really took off. In fact, Gushue won back-to-back Provincial Junior Golf Championships at ages 16 and 17, and then went on to win the his Provincial Men's Amateur Championship at age-18. By age-16 Gushue was playing to a very impressive plus-three handicap (i.e., three under par), and was invited his first Royal Canadian Golf Association (RCGA) Evaluation Camp at age-17. "Funny thing, actually, my roommate two years in a row at those camps at Royal Montreal, was Brad Fritsch. He's on the PGA tour now," he remembers. "[Canadian Professional Golfer] was at those camps too, along with a few other guys who are still playing golf at the professional level." Gushue attended that camp for a total of three summers, but realized that he was somewhat behind many of the other invitees. "I knew I was definitely not as good as those guys. I thought I could get there though, and I gave it a couple more years, but wasn't really able to close the gap," says Gushue. "Then, it came to a point where I had to choose one sport over the other, and curling won out."

Period 2: Start of Men's to 2006 Olympic Winter Games

On the surface, Gushue's transition juniors to men's play appears to have been a relatively smooth and successful one, especially considering that he won his first men's major title, the 2003 Newfoundland and Labrador Men's Championship, at age-22. However, when one factors in his initial experiences on the World Curling Tour, it is clear that he did encounter some challenges. "We started out that period as the best team in the province, from a Men's standpoint, but our development was not going to continue much if we stayed around here," Gushue explains. "We had to get out and play [List of Champions] of the world, and take our lumps against them."

Gushue defended this provincial title the following season at age-23, and followed up by leading his team to an impressive 8-3 round robin record at the 2004 Brier, before eventually bowing out in the playoffs. Then, at age-24, he managed to qualify for the Canadian Olympic Trials, and in so doing became part of Curling Canada National Team Program for the first time. In that same year Gushue competed in all four Grand Slam events, and posted a runner-up finish in the most prestigious of those events, the 2005 Players' Championship.

This steady climb to the top of the sport reached its pinnacle at age-25, when Gushue won gold at the 2006 Olympic Winter Games in Torino, Italy. He offers a unique and interesting perspective on that accomplishment, and one that helps to put the journey that he had taken up to that point into perspective. "The whole Olympic experience was pretty amazing. It was everything I dreamt it would be, and it still keeps me motivated," says Gushue. "But, I don't think it changed me much as a curler. I think just my experience, and teammates, and coaches have changed me as a curler."

Given his team's rapid ascent, and the fact that he plays the pivotal Skip position, it should come as no surprise that Gushue's personal shot-making was also quite impressive in these years. This is evident from Table D.4, which compares his shooting accuracy to positional standards in his three Brier appearances during this period. It should be noted that Gushue ranked among the top-three Skips at the first two Briers that he was part of in these years, and although his shooting accuracy clearly declined in his third, he still managed to out-perform more than half of the 12 Skips that make up any Brier field.

Table D.4

Brad Gushue's Shooting Accuracy at the Brier vs. Positional Standards: Period 2

Age	Season	Gushue's Rank	Gushue's %	Position Best	Position Average
22	2002-03	3	82%	85%	80%
23	2003-04	2	83%	84%	77%
24	2004-05	T5	78%	83%	77%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Gushue's impressive personal performances were built on the foundation of an extensive training and competition investment that he made throughout this period, and that is summarized in Table D.5. This table provides a detailed breakdown of all developmental activities and shows that he invested 4,625 training hours, 1,794 competition hours, and 6,419 overall curling-related hours during Period 2. This brought his cumulative totals to 9,325 training hours, 4,089 competition hours, and 13,414 overall curling-related hours as of the end of this period.

Table D.5

Brad Gushue's Curling-Related Training and Competition Hours: Period 2

Period 2		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
21-23	639	546	750	840	450	756
24-25	376	414	500	560	0	588
Period 2	1,015	960	1,250	1,400	450	1,344
Cumulative	2,715	1,770	2,000	2,840	1,650	2,439

Note. Gushue invested 4,625 training hours and 1,794 competition hours, for a total of 6,419 overall curling-related hours during Period 2. At this point his cumulative totals sat at 9,325 training hours, 4,089 competition hours, and 13,414 overall curling-related hours.

However, this drive was not without its complications, and this is something that Gushue freely acknowledges. “There was probably times, leading up to the Olympics, that I somewhat alienated myself from the team because I pushed them so hard, in trying to get so much out of them,” he says. With this in mind, Gushue was grateful for the efforts of his Olympic team coach, BG Coach 2, who helped him to channel his drive as productively as possible. “What [BG Coach 2] did, was he found a way to get the most out of everybody and to get us all working together as well as we could,” he says. “I learned a lot from him in that regard, how to manage a team and get more out of players by how you handle yourself, how you handle them, how you speak, mannerisms on the ice, a lot of that stuff.”

As for his teammates themselves, BG Teammate 2 and Gushue continued to be regular practice partners, but their friendship became somewhat strained in the lead-up to the Olympic Trials. “[BG Teammate 2] and I had a stretch there where we were inseparable as friends,” he says. “Then, I was pushing so hard for the Olympics, I was essentially a slave driver, to be honest. Never satisfied, probably not a whole lot of fun to be around.” Beyond BG Teammate 2, another key teammate that Gushue had during this period was two-time World Champion Skip, BG Teammate 3, who was initially added to his Olympic Trials team at the alternate position.

However, shortly before the Trials the team decided to bring BG Teammate 3 into the active playing line-up, where he would end calling the game and throwing Second’s rocks. This meant that Gushue became a sweeper, but continued to throw Skip’s rocks. Gushue has an interesting perspective on the role that BG Teammate 3 played on this team, and a perspective that is indicative of an athlete with an already highly developed level of confidence and expertise. “[BG Teammate 3] had an impact for sure. But, a lot of people

think that that was really a transformational point in my career, and I would have to disagree with that,” said Gushue. “I think it was definitely an improvement phase, but by no means transformational.”

With respect to his technical development, the 1,015 technical training hours that Gushue accumulated during this period were focused primarily on refining his shot-making skills with BG Teammate 2 as his regular practice partner. “To be quite honest, I barely went to any classes,” he says. “[BG Teammate 2] and I we used to try to get in a lot of same classes the first couple years, and we'd just usually ditch them and go down to the curling club to throw some rocks.” In addition, if he found himself having delivery issues he would return to the basics that he had learned during his junior years. “Sometimes, if you let things go, you find your shoulders aren't necessarily square. You start reaching a bit. You might start throwing off your right eye a little bit too much, or your left eye,” he explains. “Just little tweaks.”

Interestingly, when commenting on his tactical development Gushue does not mention any of the 610 tactical training hours that he accumulated during this period. Instead, he attributes any development that occurred in this area to his World Curling Tour competition experiences, and his subsequent analysis of them. “You play a pretty good game, but you still find a way to lose by a couple points,” Gushue explains. “When you start analyzing the game, it's in how you miss certain shots, and sometimes how you make them.” Therefore, it is reasonable to connect Gushue’s tactical development to the 1,344 hours of event-based competition that he amassed during these same years.

As it relates to his physical development, the 1,250 physical training hours that he managed to accumulate during this period are noteworthy, especially considering the late

limited commitment that he had made during the previous period. However, what is even more noteworthy is the intensity of physical training that he undertook, particularly as he was preparing for the Olympic Trials. “I was a pretty fit guy in the year and a half leading up to the Trials,” Gushue says. “I believe I got down to about 9 percent body fat and was able to do, I think, 11.5 on the beep test. I could do 100 push-ups and 100 sit-ups. I was just so driven and so focused that I pushed myself hard in the gym.”

As far as his mental development is concerned, Gushue acknowledges that, during the first few years of this period at least, he had gotten away from the more formalized approach to mental training that he embraced in his final year of juniors. However, with the Olympic Trials on the horizon, he and his teammates resumed their work with BG Mental Trainer 1, and Gushue suggests that this work was instrumental in their eventual success. “It was probably in 2004 that we really ramped it up again,” he says. “Then, in 2005 and 2006, we kept on working with [BG Mental Trainer 1], and obviously had some pretty good success.” Another person who appears to have played a meaningful role in his mental development is his BG Teammate 3, although largely by example. “He just seemed like as cool as a cucumber,” Gushue says. “Now, I know he was churning on the inside, but it was pretty neat just to see him hide it as well as he did at that time. I think that had an impact on us and made us feel comfortable that he had been there before.”

Although curling was now clearly his number one sporting priority, as Table D.6 indicates Gushue continued to be an avid golfer with 1,440 hours invested over the sport over this five year span. However, by contrast to the previous period, when he practiced extensively, he now focused exclusively on playing the game. According to Gushue, this change was quite deliberate and was intended to help him find a little more balance in his

life. “For the previous years, curling would run right into golf, and golf would run right into curling. I never had any downtime,” he explains. “I was pushing myself so hard in both sports that I just needed a break.”

Table D.6

Brad Gushue’s Other Sports Training and Competition Hours: Period 2

Sports>	Provincial & National (Baseball, Golf)		Local (Hockey, Soccer, Volleyball, Other)	
Ages	Training	Competition	Training	Competition
21-23	0	960	0	0
24-25	0	480	0	0
Period 2	0	1,440	0	0
Cumulative	2,120	7,880	474	945

Note. Gushue invested 1,440 other sport hours during Period 2, bringing his cumulative total to 11,419 hours.

Period 3: After 2006 Olympic Winter Games to Present

In the nine seasons since the 2006 Olympics Gushue appeared in the Brier every year, finishing second in 2007 at age-26 and third in 2011 at age-30. He also won three Grand Slam events, including the 2009 National at age-29, and most recently the 2014 Masters and 2014 Canadian Open at age-34. Furthermore, his teams never finished out of the top-10 on CTRS, which is a clear indication that he remained at the elite level of the sport throughout this period. With all this said, Gushue seems far from satisfied with these results, and does not hide either his disappointment or his surprise. “If you had told me 2006 that I’d be here now, having not won a Brier or even playing in another Trials, boy, that would have been hard to imagine,” he says.

However, Gushue’s spotty record in major championships belies the consistency of his personal performances, at least if his statistics from the Brier are any indication. This

is evident from Table D.7, which compares his shooting accuracy to the positional standards at the nine Briers that that he played in during this period. It should be noted that Gushue has ranked third or better among the 12 Skips in this elite field on six occasions, and has always been in the half of these positional rankings. It should also be noted that that 89% shooting accuracy that he posted in 2013 was not exceeded by any Brier Skip over the course of this period. With this in mind, it is reasonable to conclude that, when he is at his best, Gushue compares favourably to any Skip in the country as far as his personal performance level is concerned.

Table D.7

Brad Gushue's Shooting Accuracy at the Brier vs. Positional Standards: Period 3

Age	Season	Gushue's Rank	Gushue's %	Position Best	Position Average
26	2006-07	4	80%	85%	77%
27	2007-08	T3	81%	88%	79%
28	2008-09	3	86%	89%	78%
29	2009-10	2	83%	88%	77%
30	2010-11	T2	84%	87%	78%
31	2011-12	T5	78%	86%	78%
32	2012-13	T1	89%	89%	82%
33	2013-14	T3	85%	87%	82%
34	2014-15	T4	82%	86%	81%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Despite his many successes, Gushue found a way to maintain the same unyielding commitment to training and competition that he displayed earlier in his career. This is apparent from Table D.8, which details the hours he invested in curling-related training and competition during this most recent period of his career. As this table indicates,

Gushue invested 7,150 training hours and 2,646 competition hours, and 9,796 overall curling-related hours during Period 3. This brought his cumulative totals to 15,758 training hours, 6,735 competition hours, and 22,493 overall curling-related hours as of the end of the 2014-15 season.

Table D.8

Brad Gushue's Curling-Related Training and Competition Hours: Period 3

Period 3		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
26 Only	188	207	250	280	0	294
27-29	564	411	450	600	0	882
30-32	564	486	750	600	0	882
33-34	376	324	700	400	0	588
Period 3	1,692	1,428	2,150	1,880	0	2,646
Career	4,407	3,198	4,150	4,720	1,650	5,085

Note. Gushue invested 7,150 training hours and 2,646 competition hours, for a total of 9,796 curling-related hours during Period 3. As of the end of the 2014-15 season, his cumulative totals sat at 16,475 training hours, 6,735 competition hours, and 23,210 overall curling-related hours.

As impressive as his personal work ethic and performance level have been, Gushue is well aware that curling is a team sport, and admits that teammate commitment issues have been a considerable source of frustration for him over the years. So much so that in the first few years of this period his frustration led him to contemplate stepping away from the sport. "It's been a real challenge to try and find four guys who are all on the same page, and all working as hard at it," Gushue admits. "I can remember thinking, 'Why am I doing all this when I can't get the other guys to do the same thing?'" With this said, his decision to persevere seems to have carried with it a more positive and productive approach to relating to his teammates.

In fact, in commenting on his evolution as a curler through this most recent period of his career, Gushue point to just such an approach. “I think I’m a much more rounded curler,” he says. “I think I’ve always been a really good shot-maker. But, I believe now I’m a much better leader. And, I think I’m an infinitely better teammate than I was in the past.” Gushue appears to have used this newfound perspective as he began to assemble his current team, and recognized that his younger teammates were in need of some development. “That’s where I grew as a player, in that I knew I had to help [BG Teammate 4] and [BG Teammate 5] along, and it was the same with [BG Teammate 6] when he came in. It’s been rewarding for me to see how all of those players have evolved into what they are now,” he says. “To see them gain the knowledge that [BG Teammate 2] and I gained from all those years playing on Tour.”

According to Gushue, a key element of this mentorship role occurred in major competitions, as this is where his younger teammates’ lack of experience and tactical knowledge was the most evident. “We played in two Slam finals last year with [BG Teammates 5,4, and 6], he explains in referring to the 2013-14 season. “I was the one walking them through it with what to expect and how you need to handle situations.” However, Gushue appears to be very pleased to have some support in this area now that BG Teammate 2 is back on the team after a three-season hiatus. “This year we got into two Slam finals again, and I didn’t have to tell [BG Teammate 2] anything, because he’s been through it,” he says. “That was definitely a benefit.”

Gushue’s decision to take on a mentorship role also appears to have been related to some of the challenges his teams have encountered on the coaching front. “We’ve had a little bit of a revolving door as far as coaches,” he says. “The challenge now is that the

commitment level is so high, you have to compensate coaches. And, there have been some pretty dry years in there, where we just didn't have the funds to do that." However, Gushue appears to have utilized coaches to the extent that others have paid for them, which for the most part has meant those who have gone to the Brier with his teams. Accordingly, most of the technical coaching that has been done with his current team has fallen to Gushue himself. "I've been the guy doing all the technical adjustments," he says. "If my teammates had issues, they would ask me to go over and look at it. But, it's really hard to be critical when you're still a teammate."

In keeping with this new role, it appears that a significant proportion of the 1,182 technical training hours that Gushue accumulated during this period were utilized somewhat differently than they might have been in the past. "There's not nearly as many times when I practice by myself these days," he says. "That's not because I've reduced my amount of practice, it's just that the other guys are there at the same time now." Furthermore, beyond who is in attendance, it is evident that the microstructure of these practices has been adjusted to some degree as well. "Our practice habits have probably improved a little bit too, and I hope they're going to improve even more with some of the changes we're trying to implement," Gushue says. "It's probably not as much volume as in the past, but from a time standpoint, it's the same. But, our practices are still mostly technical in nature."

As was the case previously, Gushue continued to use competition as the primary vehicle for his tactical development during this period, although he appeared to have formalized this approach more than ever before. "It's really hard to work on game situations in practice, because unless you have the intensity, unless you have the opponent

and the situation all nailed down, you don't get much out of it," he explains. "So, what we do is add some smaller events to our schedule, and use those events as opportunities to try new some things and really analyze what happened." With this approach in mind, it is clear that, from Gushue's perspective at least, the 2,646 hours that he spent in competition during this period were considerably more important to his tactical development than the 958 hours that he spent in tactical training.

As it relates to his physical development, even though the 2,150 physical training hours that he accumulated during this period represent a very similar annual investment to what occurred during the previous period, Gushue's motivation and approach were in fact quite different. "As I've gotten older, the motivation for me to get up and go to the gym myself is pretty much gone," he says. "I couldn't do it on my own anymore." Consequently, Gushue elected to utilize his National Team Program sport science funding to cover the costs of a personal trainer, and feels very good about doing so. "If I didn't have a trainer working out with me now, boy, it'd be real hard for me to be in the shape that I'm in," he explains. "It's been a necessary step for me to continue from a physical standpoint to be at the level I'm at."

Although his relationship with BG Mental Trainer 1 continued during this period, including bringing him to the 2012 Brier as their listed 'team coach', Gushue also assumed greater personal responsibility for his own mental development. To this end, he made a point of facing his competitive failures head-on, and attempted to use them as opportunities for growth and improvement. "Looking back on my career so far, I think I've learned the most from some of the darker moments I've gone through," Gushue explains. "I think that the positive stuff it's fun, it's what you play for, but I don't think it necessarily

makes you better.” In fact, he applied this very approach to his most recent setback, the 2015 Brier, where he ended up fourth in the playoffs after finishing the round robin at the top of the standings. “It was a bad moment in my curling career, to be quite honest. I’ve spent the last couple months analyzing it, and probably over-analyzing it, but definitely come out on the other side with some strategies on how to improve,” Gushue says. “I feel I’m pretty good at doing that, and I think that’s how I’ve been shaped.”

Although curling is clearly his main sporting priority, Gushue still played golf on a regular basis. This is confirmed by Table D.9, which shows that he invested 880 hours in other sports during Period 3, and that his cumulative total through the 2014-15 season was 12,299 hours. As this table also confirms, Gushue remained resolute in his decision not to practice, and further reduced the number of rounds he plays during this period. “Golf has just become an opportunity to get out, get some sun, and have a beer with a couple buddies,” he explains. “It’s nothing more than a social thing now.” With this said, despite portraying himself as a purely recreational golfer, it should be noted that Gushue still managed to maintain a single-digit handicap throughout this period.

Table D.9

Brad Gushue’s Other Sports Training and Competition Hours: Period 3

Sports>	Provincial & National (Baseball, Golf)		Local (Hockey, Soccer, Volleyball, Other)	
Ages	Training	Competition	Training	Competition
26 Only	0	240	0	0
27-29	0	240	0	0
30-32	0	240	0	0
33-34	0	160	0	0
Period 3	0	880	0	0
Career	2,120	8,760	474	945

Note. Gushue invested 880 other sport hours during Period 3, bringing his career total to 12,299 hours.

Career Trajectory by Competitive Milestone

The previous sections of this history have provided a detailed, period-by-period account of the many factors that have shaped the ongoing development of Gushue's elite-level curling expertise. This final section will summarize his career trajectory in relation to five key competitive milestones (i.e., first pre-men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded men's major title). These milestones form the basis of Table D.10, which shows his age and the years of curling experience in each case.

Table D.10

Brad Gushue's Age and Years of Experience by Competitive Milestone

Milestone	Event	Age	Years Curling
1 st Pre-Men's Major	1995 NL Provincial Juniors	14	2
1 st Pre-Men's International	2001 World Juniors	20	8
1 st Men's Major	2003 NL Provincial Men's	22	10
1 st Men's International	2006 Olympics	25	13
Last Recorded Men's Major	2015 NL Provincial Men's	34	22

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

This table shows that Gushue had been curling for 22 years as of the time of data collection (i.e., the end of the 2014-15 season), and confirms that he has been quite successful during these years. However, as has been demonstrated throughout this history, Gushue's success has been the product of a substantial investment in curling training and competition over the course of his career. With this in mind, Table D.11 summarizes his

cumulative investments in these activities in relation to the five competitive milestones that have just been discussed.

Table D.11

Brad Gushue's Cumulative Curling Training and Competition Hours by Competitive Milestone

Milestone	Training	Competition	Overall
1 st Pre-Men's Major	200	450	650
1 st Pre-Men's International	4,700	2,295	6,995
1 st Men's Major	6,550	3,099	9,649
1 st Men's International	9,325	4,089	13,414
Last Recorded Men's Major	16,475	6,735	23,210

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

It is noteworthy that by the time he had won his last recorded men's major title, Gushue had invested 16,475 hours in curling training, 6,735 hours in curling competition, and 23,210 hours in curling overall. It is also noteworthy that his hourly investments grew steadily as he achieved each of these milestones, which is indicative of a serious long-term commitment to the sport. For a more detailed breakdown of this commitment, please see Table D.12, which includes cumulative data on each type of curling training and competition in relation to all five competitive milestones.

Despite his many accomplishments Gushue showed no signs of slowing down, which is something that he attributes to two important goals. "I'm still pushing myself, because I've still got some goals that I want to achieve," Gushue says. "I guess my two biggest goals, and I'd have to list them as 1A and 1B, would be winning a Brier and getting back to the Olympics." Therefore, having already won the Olympics, it appears that he actually places a

slightly higher priority on the Brier title. "I believe I've been good enough to win a Brier. I believe we've had teams that have been good enough to win the Brier, but we just haven't done it," Gushue says. "That motivates me and keeps me going."

Table D.12

Brad Gushue's Cumulative Curling and Other Sport Hours by Competitive Milestone

Category>	Curling Training					Curling Competition			Curling	Other Sports	Combined
Milestone	Technical	Tactical	Physical	Mental	All	League	Event	All	All	All	All
1 st Pre-Men's Major	200	0	0	0	200	300	150	450	650	2,859	3,509
1 st Pre-Men's International	1,700	810	750	1,440	4,700	1,200	1,095	2,295	6,995	9,979	16,974
1 st Men's Major	2,126	1,174	1,250	2,000	6,550	1,500	1,935	3,099	9,649	10,619	20,268
1 st Men's International	2,715	1,770	2,000	2,840	9,325	1,650	2,439	4,089	13,414	11,419	24,833
Last Recorded Men's Major	4,407	3,198	4,150	4,720	16,475	1,650	5,085	6,735	23,210	12,299	35,516

Table D.13

Brad Gushue's Pre-Men's Major Titles and Top-3 Finishes

Age	Season	World Juniors	Canadian Juniors	Provincial Juniors	Canada Games	University Nationals	World Universiade
14	1994-95	N/A	X	1	N/A	N/A	N/A
15	1995-96	N/A	N/A	1	N/A	N/A	N/A
16	1996-97	N/A	X	3	N/A	N/A	N/A
17	1997-98	N/A	X	1	N/A	N/A	N/A
18	1998-99	N/A	3	1	N/A	N/A	N/A
19	1999-00	N/A	2	1	N/A	N/A	N/A
20	2000-01	1	1	1	N/A	N/A	N/A
N/A	Titles	1	1	6	N/A	N/A	N/A
N/A	Top-3's	1	3	7	N/A	N/A	N/A

Table D.14

Brad Gushue's Men's Major Titles and Top-3 Finishes

Age	Season	Olympic Games	Olympic Trials	Men's Worlds	The Brier	Men's Provincials	Canada Cup	Players' Grand Slam	Can. Open Grand Slam	National Grand Slam	Masters Grand Slam
21	2001-02	DNP	DNP	DNP	DNP	X	N/A	DNP	DNP	DNP	X
22	2002-03	N/A	N/A	DNP	X	1	DNP	X	DNP	DNP	DNP
23	2003-04	N/A	N/A	DNP	X	1	DNP	X	DNP	DNP	DNP
24	2004-05	N/A	N/A	DNP	X	1	X	2	X	X	X
25	2005-06	1	1	N/A	N/A	N/A	X	X	X	X	X
26	2006-07	N/A	N/A	DNP	2	1	3	X	X	X	X
27	2007-08	N/A	N/A	DNP	X	1	3	X	X	X	X
28	2008-09	N/A	N/A	DNP	X	1	X	X	X	2	T3
29	2009-10	DNP	DNP	DNP	X	1	N/A	2	X	1	T3
30	2010-11	N/A	N/A	DNP	3	1	DNP	DNP	X	X	X
31	2011-12	N/A	N/A	DNP	X	1	DNP	X	X	T3	X
32	2012-13	N/A	N/A	DNP	X	1	X	X	X	X	X
33	2013-14	DNP	DNP	DNP	X	1	N/A	T3	2	2	DNP
34	2014-15	N/A	N/A	DNP	X	1	X	X	1	X	1
N/A	Titles	1	1	0	0	12	0	0	1	1	1
N/A	Top 3's	1	1	0	2	12	2	3	2	4	3

Appendix E: Marc Kennedy's Career History

Marc Kennedy has won nearly every major championship that the sport of curling has to offer. In fact, as of the end of the 2014-15 season he had six Alberta Men's Championships, two Briers, and the 2008 World Championship to his credit. He had also won three Canada Cups and a total of 11 Grand Slam titles. Furthermore, Kennedy's teams have held the number one ranking on the Canadian Team Ranking System (CTRS) at the end of three different seasons, and have never finished lower than sixth since the system was created in 2006-07. With all this said, the pinnacle of his career to date came in 2010, when he won gold at the Olympic Winter Games in Vancouver. A complete record of Kennedy's competitive accomplishments has been included at the end of this history (see Tables E.13 and E.14).

Kennedy was born in St. Albert, Alberta on February 5, 1982, and grew up there with his parents Don and Connie, and his older brother Glen. After graduating from Paul Kane High School, he went to the University of Alberta where he earned his Bachelor of Commerce degree in 2005. Kennedy invested in a frozen foods retail store with a couple of teammates in 2006, and then bought the store outright in 2010. He then sold the store in 2012 in order to focus on curling and family. Kennedy now works as a part-time Olympic Ambassador and is a part-time graduate student at the University of Alberta, where he is working on a Master of Business Administration. He married his wife Nicole in 2008. They currently live in St. Albert with their two daughters, Aubrey and Brechan.

Note: All quotations in this history were drawn from Marc Kennedy's Curling Life Story. Retrieved from <http://www.curlinglifestories.ca>.

Period 1: Start of Curling to End of Juniors

From the time that Kennedy was first introduced to the sport to the end of his junior career curling was always a family affair. “My dad took over the Little Rocks program at the St. Albert Curling Club, so once a week on Sundays, for two hours, we were on the ice with him,” he explains. “It was as much about son-father bonding time as anything else, and that went on for five or six years.” These Sunday Little Rocks sessions were supplemented by another type of family curling, and one that provided Kennedy and his brother Glen with some valuable extra ice time. “My dad curled Tuesday night men’s, and mom and dad curled Saturday night mixed. And, we didn’t have babysitters very often, so we were at the rink,” Kennedy says. “Every time they were done playing, we were waiting for the first sheet to finish so we could get out there and throw rocks and practice.”

This extra practice paid off, as Kennedy became quite skilled at a very young age. In fact, at age-13 Kennedy, playing Third for his brother Glen, made it all the way to the final game of the Alberta Junior Men’s Championship, where he ended up losing to curlers who were several years his senior. “That was the time when I decided this is something I want to do for the rest of my life,” Kennedy recalls. “And, it wasn’t so much the success of winning; it was the pain of the defeat. Wanting to get back and win, because losing sucks so bad.” Kennedy would end up winning his first Alberta Junior Men’s Championship at age-15, as the Second for future Olympian, MK Teammate 1, and with his brother Glen at Third. He would then add two more Alberta Junior titles at ages 16 and 18, as the Third for MK Teammate 2, but would never advance to the playoff round at the Canadian Juniors. However, the Canadian Juniors was certainly not the only measure of Kennedy’s competitive success during this initial period of his career.

In fact, Kennedy also won the gold medal the 1999 Canada Winter Games at age-16 as the Skip for Team Alberta, even though he had never played that position before. He has particularly vivid memories about winning at the Alberta Trials to qualify for the Games. “I remember having to draw the button twice in the 10th end just to go to the extra end. And then we stole the extra end,” Kennedy recalls. “Having to make the last shots, and being able to do it, added a lot to my confidence.” Another key achievement during this period came several years later, at age-20, when he won the gold medal at the 2003 Winter Universiade as the Third for Brandon University’s MK Teammate 3. What makes this accomplishment even more impressive is the fact that Kennedy actually started Universiade as the selected alternate, but was added to the playing line-up when the team was on the brink elimination. “Things just clicked right away,” Kennedy says. “By the end of that event, there just wasn’t anybody that was going to beat us.”

Beyond adding to his already strong pre-men’s resume, these accomplishments are indicative of a level of adaptability and ease of learning that would be a hallmark of Kennedy’s men’s career. In many respects, the same can be said for his personal performances at his three Canadian Juniors, especially considering that he played two different positions at those events. This is apparent from Table E.1, which compares his shooting accuracy at the Canadian Juniors to the established positional standards at that event. As indicated, Kennedy ranked second at the Second position at age-15, and then ranked fourth and second at the Third position at ages 16 and 18. It should be noted that there were 13 teams at each Canadian Junior that Kennedy played in, and therefore 13 players at each position.

Table E.1

Marc Kennedy's Shooting Accuracy at the Canadian Juniors vs. Positional Standards – Period 1

Age	Season	Kennedy's Rank	Kennedy's %	Position Best	Position Average
15	1997-98	T2	77%	79%	72%
16	1998-99	4	79%	84%	75%
18	2000-01	T2	76%	80%	72%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Regardless of his talent, Kennedy sees his accomplishments as the product of hard work. “The idea of practicing an hour and a half or two hours a day wasn’t something a lot of curlers were doing in juniors,” he says. “But, it was just natural for me to bring that into the sport of curling at a young age, which meant practicing curling, and sweeping, and getting your heart rate up, and being athletic.” Kennedy’s commitment to hard work is evident from Table E.2, which provides a detailed breakdown of the hours he invested in curling-related training and competition before age-21. As this table indicates, he invested 3,654 hours in training and 1,770 hours in competition during Period 1, for a combined total of 5,424 hours.

Table E.2

Marc Kennedy's Curling-Related Training and Competition Hours: Period 1

Period 1		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
6-8	96	0	0	0	0	0
9-11	96	0	0	0	96	0
12-14	120	80	96	76	180	180
15-17	180	144	432	336	360	378
18-20	210	276	648	864	135	441
Period 1	702	500	1,176	1,276	771	999

Note. Kennedy invested 3,654 training hours and 1,770 competition hours, for a total of 5,424 curling-related hours during Period 1.

Any account of Kennedy's junior career would be incomplete without acknowledging the importance of his family to his development. For instance, there is no question that his brother, Glen Kennedy, was his most influential teammate during the first decade of his curling career. "He was pretty special at that age in terms of how good he was," Kennedy says. "I was more of just the hot-tempered, hard-throwing brother, just bringing the intensity level up, because Glen was a pretty calm guy. We just had a unique dynamic." When MK Teammate 1 aged out of juniors after the 1997-98 season, brother Glen was slated to take over as Skip. However, he ended up being sidelined with a major knee injury that would end his junior career, which meant that Kennedy would face a curling season without his brother for the first time. "Getting the chance to play with Glen for a long time was really special. I think Glen was a better curler than me through all those years, even up to the year when he got hurt," Kennedy says. "We were both teenagers, so it sucked to lose him, but at the same sense he's been very supportive ever since that day."

Just as his brother was integral to Kennedy's development during this period, so too was his father. In fact, his father served as his team coach throughout his junior years, and the two developed a special bond as a result. In terms of his coaching contribution, it appears that his father played an important role in helping Kennedy to manage expectations when necessary, and to sort through any performance gaps that might have existed. However, as much as Kennedy valued having his father as his coach, he also believes that it hindered his personal technical development. "In hindsight, it was a great thing to have my dad around, but in some of those development years, some more technical expertise definitely would have made a big difference," he says. "I ended up with certain technical deficiencies that I still have to this day because of it."

Due to this lack of technical coaching expertise, Kennedy felt compelled to analyze his own delivery, and between ages 17 and 20 in particular, he reports that he became obsessed with this particular aspect of his development. “I hated missing shots. I knew what my problems were on the ice, but I didn’t know how to fix them,” he says. “I didn’t have the right people or expertise to come in and help me, so I self-analyzed to fix it.” Consequently, it is reasonable to assume that a significant proportion of the 702 technical training hours that he accumulated during this period, and especially those that occurred in its final four years, involved these solitary analytical activities. With this said, Kennedy also reports that a significant portion of his earlier technical practice (i.e., before he reached age-17) was focused on heavy weight shots. “We spent a lot of time throwing it hard, throwing double peels, throwing run-backs. Probably more than we should have,” he says. “But, it was part of who we were, and part of our self-esteem; the fact that we could do it. So, we practiced it a lot.”

As it relates to his tactical development, it is interesting to note that Kennedy considered some aspects of the 500 hours of tactical training that he accumulated during this period to be more important than others. To this end, he seems to downplay the contribution that on-ice tactical training might have, especially during the earlier years of this period. “When we were younger, I’m not sure that the attention level is there to really understand the strategy part of curling,” he explains. “So, a lot of it was just repetition, and gut feeling, and learning from mistakes you may have made the previous game.” With this said, Kennedy became more proactive with his tactical development as he matured, with a significant portion of those efforts focused on observation and analysis. “Later on, we watched a ton of games on TV. Having the chance to re-wind and re-watch to see what

guys did differently, or what mistakes they made that you might have done differently,” he says. “That became the foundation for those tactical decisions.”

In terms of his physical development, Kennedy points to one of his other sporting passions, football, as being the primary motivation behind the 1,176 physical training hours that he accumulated during this period. “It was really the football that pushed the fitness part of it,” he says. “Right around those early high school years there was a bit of pressure to get in the gym and get stronger and faster and fitter.” Although it is likely that these physical training activities also benefited as a curler, he is quite clear about the impetus behind them. “We didn’t stay in shape for the purpose of curling,” he says. “We stayed in shape for the purpose of other sports. It just happened to carry over to curling.”

As far as his mental development is concerned, Kennedy did not receive any professional guidance in this area during this period, and as such the 1,276 mental training hours that he accumulated were entirely self-directed. More specifically, his comments confirm that he spent a considerable amount of time on personal reflection. “The mental part for me was I had troubles not thinking about curling, and my other sports,” Kennedy says. “It was always on my mind, whether I’m in the classroom, or with friends, it was always there.” Over time, his reflection helped him to develop a personal mental strategy that enabled him to perform at a high level. “There were times where there was a lot of fear of making mistakes,” he recalls. “But, just over those years of competing, and losing, and winning, you just develop some mental skills that you know work for you. What you have to say to yourself, how to deal with your own anxiety, your own nerves.”

Beyond his extensive involvement in curling, Kennedy was also active in a number of other sports during this period, including golf and karate. However, the two other sports

for which he showed the greatest interest and aptitude were soccer and football. It is noteworthy that he competed at the national level in both of these sports, and that he believes he learned some important lessons from them. “One thing I learned from these sports was the work ethic. It was about being there for two hours a day, every day, being on time, and busting your butt,” he says. “That’s something I carried over to curling that not a lot of people in curling were doing.”

Kennedy also devoted a considerable amount of time and energy to other sports during this period. This is apparent from Table E.3, which summarizes the training and competition hours he invested in all sports other than curling before age-21. As this table indicates, Kennedy invested a total of 2,917 other sport hours during Period 1. It should be noted that this total is more than half of the 5,422 curling-related hours that he accumulated during this same period, which shows that other sports were also quite important to him during these early years of his career.

Table E.3

Marc Kennedy’s Other Sports Training and Competition Hours: Period 1

Sports>	Provincial & National (Football, Soccer)		Local (Golf, Karate, Other)	
Ages	Training	Competition	Training	Competition
6-8	29	29	0	0
9-11	222	150	105	189
12-14	246	225	0	192
15-17	360	72	0	192
18-20	450	72	0	384
Period 1	1,307	548	105	957

Note. Kennedy invested a total of 2,917 other sport hours during Period 1.

Kennedy began playing soccer at age-8, and was competing at the provincial level in by age-10. “I wasn’t the best scorer, he remembers. “But, I had a good work ethic, was very coachable, and again, had some success at a young age.” Kennedy went on play in the 1997 Alberta Summer Games. “I made Alberta’s Summer Games team when I was younger than everyone else,” he said. “It helped my confidence level, and allowed me learn those team skills that you learn playing with older guys.” Although he clearly could have continued with his soccer career, Kennedy elected to step away from the sport in order to focus on his other off-season sporting passion, football.

As was the case with soccer, Kennedy began playing football at age-8. Interestingly, his father was his football coach right up to High School, which further added to the bond that the two had built from curling. By age-12 Kennedy was the excelling as starting quarterback for the St. Albert Peewee team, despite being one of the younger players on the roster. In fact, he was doing so well that he ended up skipping the Bantam division altogether, and began playing at Paul Kane High School at age-14. After a couple of years on the sidelines, Kennedy would star as the team’s starting quarterback, and would then go on to play for the Edmonton Huskies in the Canadian Junior Football League. However, by the end of his time in that league, at age-20, Kennedy knew that his football career was over. “Eventually, guys just got too good, and too big, and too strong, and I didn’t fit in football anymore,” he says. “But, it really helped me from a confidence standpoint, and with leadership, and all those team skills that you learn in a sport like that.”

Period 2: Start of Men's to 2008 World Championship

Kennedy made a very successful transition to men's competition, thanks in no small measure to the fact that he was recruited right out of juniors to play Second MK Teammate 4, who was already one of the top Skips in the sport. With MK Teammate 4 at the helm, Kennedy won the 2004 Players' Championship at age-21, in just his first year of men's eligibility. In keeping with the protocols used in this study, this means he could be confirmed as belonging at the elite level of the sport at that point, although in Kennedy was unsure that he belonged. "I wasn't very good," he says bluntly. "I was a good sweeper, and like I said, I was young and I worked hard and I was coachable. But, [MK Teammate 4] really took me under his wing and tried to teach me as much about the game as he could."

Although there are no reliable personal performance statistics available from the events that he played during his early years with MK Teammate 4, that team's competitive record would suggest that Kennedy soon found a way to hold up his end of the bargain. In fact, in their final two years together the team would post four more top-three finishes in major events, including a semi-final appearance at the 2005 Olympic Trials. However, it was not until Kennedy was age-24, when he and MK Teammate 4 joined forces with already two-time Olympian MK Teammate 5 that he began to achieve truly world-class results. That year the new team would win three Grand Slam titles, along with Kennedy's first-ever Alberta Men's Championship, and would finish the season in first-place on the then newly introduced CTRS.

Kennedy would officially reach the pinnacle of the sport at age-25 when his team posted top-three finishes in every major event in the sport, and won the Alberta, Canadian, and World Championships with an incredible 29-2 overall record. In looking back on that

World Championship, Kennedy remains very impressed with the leadership that MK Teammate 5 showed, despite the fact that he had failed to win gold in his five previous experiences on the international stage. “One thing I remember [MK Teammate 5] telling us is ‘It’s a World Championship, and it’s a big stage, and there’s lots of people, but it’s still just the game of curling.’ And, he had a way of portraying that on the ice,” Kennedy recalls. “I found a lot of calm and peace of mind in that. Because, it’s easy to realize the stage you’re on, and to be nervous and anxious, but that’s rarely going to help you play better.

With this said, the 2008 World Championship title was not without its challenges, with both of the above-mentioned losses coming during this event. The most significant of these losses came in the Page 1 vs. 2 playoff game against Scotland, when Kennedy and MK Teammate 6 made a shot management error on MK Teammate 5’s final shot that led to the loss, and dropped team into a sudden-death semi-final the following day. “I remember, personally, that was very difficult. I didn’t sleep that night,” he says. “But, I decided then and there that with that anxiety and nerves, and some fear of losing, that I wasn’t going to let it take over. I turned it around, and had nothing but positive energy.”

These comments are indicative of where Kennedy now was in his development, a curler with a highly refined level of expertise. This is confirmed by his personal performances, which by this point in his career were now every bit as impressive as his team’s results. This is evident from Table E.4, which compares Kennedy’s shooting accuracy to the established positional standards from the two Briers that he played in during this period. As you can see from this table, he ranked first among the 12 Seconds in the fields in both of his Brier appearances, and posted an outstanding 93% shooting accuracy in 2008 to help his team to the title.

Table E.4

Marc Kennedy's Shooting Accuracy at the Brier vs. Positional Standards: Period 2

Age	Season	Kennedy's Rank	Kennedy's %	Position Best	Position Average
24	2006-07	T1	85%	85%	81%
25	2007-08	1	93%	93%	82%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

These outstanding personal performances were facilitated by an extensive training and competition investment that Kennedy made during these middle years of his career. The extent of this investment is apparent from Table E.5, which details the hours that he invested in a wide range of developmental activities. As this table indicates, Kennedy invested 3,451 training hours and 1,281 competition hours during this period, for a total of 4,732 hours overall curling-related. This brought his cumulative investment to 7,105 training hours, 3,051 competition hours, and 10,156 overall curling-related hours to this point in his career.

Table E.5

Marc Kennedy's Curling-Related Training and Competition Hours: Period 2

Period 2		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
21-23	312	295	432	864	0	693
24-25	300	384	288	576	0	588
Period 2	612	679	720	1,440	0	1,281
Cumulative	1,314	1,179	1,896	2,716	771	2,280

Note. Kennedy invested 3,451 training hours and 1,281 competition hours, for a total of 4,732 overall curling-related hours during Period 2. At this point his cumulative totals sat at 7,105 training hours, 3,051 competition hours, and 10,156 overall curling-related hours.

It should be pointed out that the great majority of the training hours that Kennedy had during the first three years of this period were spent on his own. This is because he was without a local teammate until he joined MK Teammate 5's team at age-24. However, from that point onward, Kennedy would practice with MK Teammate 5 on a regular basis, and would learn a great deal from the example he set. "The biggest thing with [MK Teammate 5] was he had a level of professionalism with the sport that nobody ever had," Kennedy points out "It was his job, and when he got to the rink it was all business," he says. "I'm thankful that I got to witness that, and to be a part of that team." MK Teammate 5 also had high standards in competition, which is something that he shared with MK Teammate 4, and those standards also influenced Kennedy's development. "There was a little bit of fear of making mistakes," Kennedy explains. "Those expectations they put on us definitely made us better sweepers, better communicators, better at everything. So, we learned how to get better, and better, and better."

It is also noteworthy that Kennedy was essentially without a local coach during the first three years of this period as well. "There wasn't a lot of coaching influence other than my dad at home," he says. "But, at that point, I had kind of surpassed my dad's knowledge, technically and strategically. He was a sounding board for a few things, team-related, but otherwise, I was on my own." However, that situation also changed when he joined the new team, with MK Teammate 5's long-time coach, MK Coach 1, often being part of their on-ice training sessions. "Ninety nine percent of what [MK Coach 1] does is technical, so that's where I started to make a few changes and adjustments," Kennedy recalls. "I really enjoyed that part of the game, because I've never had that much technical focus before."

As it relates to the 612 hours that he spent in technical training during this period, Kennedy points out that the new team placed a considerably higher emphasis on this aspect than his previous team. “It was something our old team with [MK Teammate 4] didn’t focus enough on,” he says. “We looked at losses and bad results, and we looked at other things team or strategy related when, really, we just needed to be making more shots.” To this end, Kennedy provides some valuable insight into the nature and content of his technical practices with MK Teammate 4. “For [MK Teammate 5] and I, it was a matter of finding similar release points, similar lines of delivery, and similar paths of our rocks,” he explains. “I was a strong hitter, but he said, ‘Let’s get you better at draws.’ So, we spent a lot of time on draws, while at the same time doing our technical work.”

As far as his tactical development is concerned, Kennedy continued to focus on competition-related considerations, and once again makes very little reference to the 679 tactical training hours that he accumulated during this period. Instead, he points out that MK Teammate 5’s autocratic approach to shot selection made it possible for him to narrow his emphasis, and ultimately to refine the shot management aspect of his tactical expertise. “That let me focus on the progression from tracking ice, and cleaning paths, and understanding what shot was being called,” Kennedy explains. “All that developed from the mentality of ‘focus on the process, not the result,’ which I still think it’s the most important thing in curling.”

In terms of the 720 hours that Kennedy accumulated in physical training in this period, Kennedy points out that fitness was a high priority on both of the teams that played on during these years. “We were in the La Releve program”, he says in reference to his time with MK Teammate 4 as his Skip. “It was part of the program to be able to maintain a good

fitness level, so that was really when I was introduced to it from a one-on-one standpoint.” However, it would appear that he took physical training even more seriously when he joined MK Teammate 5’s team, and that this was yet another aspect of their training partnership. “Summer was four months of going to the gym four days a week,” Kennedy explains. “I ended up working with the same trainer as [MK Teammate 5], so we were at the gym together all the time.”

On the other hand, it does not appear that the 1,440 mental training hours that Kennedy accumulated during this period were spent quite as cohesively. More specifically, he felt fortunate to get some professional guidance with his mental training during his years with MK Teammate 4 at Skip, and tried to that guidance to good use. “That was another aspect of the La Releve program back in those years,” he says. “It helped me to put some things together on a personal level that helped me out on the ice.” However, this progress was stalled to some extent when he joined Teammate 5’s team. “As we got together with [MK Teammate 5], the idea of mental training and sports psychology definitely took a backseat,” Kennedy explains. “So, there wasn’t much of an evolution in this area in my time with [MK Teammate 5], other than what I did in my own head.”

Although curling was clearly Kennedy’s main sport at this point, it was not his only one. Instead, as is evident from Table E.6, he continued to play other sports, accumulating 475 hours during Period 2 and bringing his cumulative other sport total to 3,392 to this point in his career. However, as is also evident, Kennedy devoted most of his other sport time to golf during this period, although he is quick to point out that he did so largely because of the parallels that he saw between it and curling. “At that stage I started to take golf a little more seriously, because golf and curling are so similar,” he explains. “It wasn’t

about trying to be the best golfer. It was about how to deal with misses, and deal with the technical part of golf. Using that to try to relate it over to curling.”

Table E.6

Marc Kennedy’s Other Sports Training and Competition Hours: Period 2

Sports> Ages	Provincial & National (Football, Soccer)		Local (Golf, Other)	
	Training	Competition	Training	Competition
21-23	0	27	0	384
24-25	0	0	0	64
Period 2	0	27	0	448
Cumulative	1,307	575	105	1,405

Note. Kennedy invested 475 other sport hours during Period 2, bringing his cumulative total to 3,392 hours.

Period 3: After 2008 World Championship to Present

As has been the case from the outset of his men’s career, Kennedy remained at the elite level of curling throughout this period. This is confirmed by his teams’ year-end ranking on CTRS, which were never lower than sixth at any point during this period. In 2008-09, at age-26, Kennedy and his teammates successfully defended their Alberta and Brier titles, once again going undefeated along the way. They would then advance all the way to the final game of the 2009 World Championship, which they actually had in their control before letting it slip away. “When it comes to World Championships, whether you win or lose them, I think it’s very important to look at them as an opportunity to get better,” Kennedy says. “We won the 2008 Worlds, which was awesome. But, if we don’t lose the 2009 Worlds, we probably don’t learn enough to win the 2010 Olympics.”

Kennedy offers an interesting perspective on his Olympic season, beginning with the feeling that he had in winning the Olympic Trials. “I felt like everything I worked really,

really hard for in my life, everything I had ever wanted, I actually accomplished it,” he recalls. “I thought about those early years, the obsessiveness and crazy amounts of practice, and missing school and struggling and all that, and it wasn’t all for nothing.” In terms of the Olympics themselves, Kennedy admits to having somewhat mixed emotions after winning the gold medal. “I look back at the experience, and although it was wonderful and it was amazing, and I was so happy to be a part of such a great team, on a personal level, I still wasn’t the curler I wanted to be,” he says.

Although there is no reason to doubt that Kennedy felt this way, his assessment is not validated by of his personal performances during this period. This is evident from Table E.7, which compares Kennedy’s shooting accuracy to the established positional standards from the 4 Briers that he competed in during this period. As indicated in this table, Kennedy ranked either first or second among the 12 players at his position in all four of his Brier appearances over this span. It should also be noted that Kennedy’s shooting accuracy never fell below 90% during this period, including in 2015 when he moved up from his familiar Second position to play Third for the first time.

Table E.7

Marc Kennedy’s Shooting Accuracy at the Brier vs. Positional Standards: Period 3

Age	Season	Kennedy’s Rank	Kennedy’s %	Position Best	Position Average
26	2008-09	1	91%	91%	81%
28	2010-11	1	90%	90%	82%
30	2012-13	2	90%	93%	85%
32	2014-15	2	91%	92%	84%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Kennedy's impressive personal performances made a strong contribution to his teams' ongoing success during this period, which can be classified as nothing other than elite. For instance, in the five seasons since the 2010 Winter Olympics, his teams managed to accumulate a total of seven victories and 16 top-three finishes in major events. Perhaps not coincidentally, it was in these same five seasons that Kennedy undertaken a deliberate plan to improve his own game. "After the Olympics were over I established a personal goal trying to get better," he says. "What type of player was I going to be in 2014? Was I going to be a pretty good Second that has nowhere to play? Or, was I going to be a good enough player that somebody's going to want me to be the next [MK Teammate 4] or [MK Teammate 5]?"

This goal propelled Kennedy's ongoing development efforts, and galvanized his commitment to an extensive training and competition program that shows no signs of letting up. This commitment is readily apparent from Table E.8, which details the hours that he invested in various curling-related activities in the most recent period of his career, at least through the end of data collection (i.e., the end of the 2014-15 season). As this table indicates, Kennedy invested 5,571 training hours and 1,932 competition hours during this period, for a total of 7,503 hours overall curling-related hours. This brought his cumulative totals through the end of the 2015-15 season to 12,676 training hours, 4,983 competition hours, and 17,659 overall curling-related hours.

Table E.8

Marc Kennedy's Curling-Related Training and Competition Hours: Period 3

Period 3		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
26 Only	150	192	144	288	0	294
27-29	450	576	576	864	0	819
30-32	405	486	576	864	0	819
Period 3	1,005	1,254	1,296	2,016	0	1,932
Career	2,319	2,433	3,192	4,732	771	4,212

Note. Kennedy invested 5,571 training hours and 1,932 competition hours, for a total of 7,503 overall curling-related hours during Period 3. As of the end of the 2014-15 season, his career totals sat at 12,676 training hours, 4,983 competition hours, and 17,659 overall curling-related hours.

While Kennedy was attempting to focus on his personal improvement, his team was encountering some major dynamics issues as the relationship between MK Teammates 4 and 5 was becoming strained. “It was probably hardest on me, because you could still see that they were the two best players in the world, but they were bringing out the worst in each other,” he explains. “I was doing my best to try to fix things, but it was impossible, and I realized that it wasn’t going to happen.” MK Teammate 4 left the team after the 2012-13 season and was replaced with MK Teammate 7, who as it turned out, was unable to play at a high enough level to allow the team to defend their Olympic title. Then, at the completion of the 2013-14 season, MK Teammate 5 retired from the sport, and Kennedy agreed to play Third on a promising new team skipped by former World Champion, MK Teammate 8.

This new team, which also includes Kennedy’s long-time teammate MK Teammate 6 at Lead and Brent Laing at Second, had a solid first season together, during which they won the Alberta Men’s Championship and ended the year as the fifth ranked team on CTRS.

“This year was a feeling-out year for our new team to see where everybody fit, and I can

now see my role,” he says. “I’m going to have to be a little bit more of a leader, a little bit more of a voice, using the experience we had with our old team and trying to bring that to the new team.” Another unique aspect of the new team is related to coaching, with MK Coach 2, a sport psychologist, bringing something different to that role. “I’ve really loved having him as our coach,” he says. “Sometimes, you get a little bit quiet and too calm in the sport of curling, and [MK Coach 2] brings a little bit of that intensity.”

As far as his technical development is concerned, it appears that most of the 1,005 technical training hours of that Kennedy accumulated in this period were spent much as they were in the previous period. “The way we did things in terms of our practices stayed pretty much the same the whole time I was with [MK Teammate 5],” he said. “[MK Coach 1] knew his role as a technical coach, and we stuck with it, because things had been working for so long.” With this said, Kennedy’s improvement plan set some key priorities within the technical area, and he appears to have addressed these priorities within the established structure. “I wanted to use these three years to learn more from [him],” he explains. “And, to work on my draw weight, and on my out-turn. The things that I thought were weaknesses. Basically, to use these three ‘grace-period’ years to improve.”

As it relates to his tactical development, there do not appear to have been any appreciable changes in this area over this period, with the impact of competition still trumping the 1,254 tactical training hours that he accumulated during this period. However, the first year that he spent with his new team has led him to the conclusion that he will need to play a considerably different role in this area moving forward. “We’ve gone from a dictatorship to a democracy, so for [MK Teammate 6] and I, it’s been a big change, and we just have to find where we fit,” he explains. “Especially, with me having been out of

the decision-making process for so long. Its been challenging at times.” However, Kennedy appears to be quite comfortable with the prospect of taking on some new tactical responsibilities. “I think I’m going to embrace the role of leadership, and feeling like I’ve got a bigger say in what happens with this team,” he says. “But, I wouldn’t have had that feeling if I hadn’t spent all those years watching [MK Teammates 4 and 5] do it.”

In terms of his ongoing mental development, it appears that the great majority of the 2,016 mental training hours that Kennedy accumulated during this period were once again spent on personal reflection. However, this situation seems to have changed in his initial season with his new team, with his new coach playing a central role in this regard. “What I like with [MK Coach 2] is his reminder of perspective,” Kennedy says. “Winning or losing curling games isn’t the most important thing in life, and losing a game isn’t the end of the world.” When this new perspective is combined with the results of his personal improvement program, Kennedy appears poised for continued elite-level success. “I feel like my personal curling career has finally gotten to the level where I’ve dreamed of it being,” he says. “In 2010 it was a dream to go to the Olympics and win, but I still wasn’t the curler I wanted to be. Now, I’m really close, if not all the way there.”

A somewhat different situation appears to have emerged with respect to Kennedy’s physical development, with key changes occurring much earlier in this period. “I’d say for the first few years with [MK Teammate 5], I just did what he was doing,” he says. “But, as I got more comfortable with [MK Teammate 5], and as I got more comfortable with myself, it was much more about what I wanted to do.” To this end, it appears that Kennedy’s 1,296 physical training hours during this most recent period were utilized differently than was the case in the previous period. “I’ve incorporated running races, cycling races, and I found

some trainers and people that I really enjoy,” he says. “Because this is something that can get very tedious and difficult, and you want to keep it fresh and exciting.”

A similar line of thinking also seems to apply to Kennedy’s other sport involvement during this period, which was now focused exclusively golf. With this in mind, Table E.9 confirms that he invested 224 hours in golf during Period 3, bringing his cumulative total to 3,616 other sport hours. Although this investment is quite comparable to the one he made during the previous period, it appears that his approach to golf is somewhat different today. “In the past golf had been similar to curling in the sense that I was semi-obsessed with the technical side of the sport,” Kennedy explains. “In recent years, I’ve started to focus much more on course management and the mental side of golf. So, even though I might not be technically as good now, I still score just as well and really enjoy the game.”

Table E.9

Marc Kennedy’s Other Sports Training and Competition Hours: Period 3

Sports>	Provincial & National (Football, Soccer)		Local (Golf, Other)	
Ages	Training	Competition	Training	Competition
26 Only	0	0	0	32
27-29	0	0	0	96
30-32	0	0	0	96
Period 3	0	0	0	224
Career	1,307	575	105	1,629

Note. Kennedy invested 224 other sport hours during Period 3, bringing his career total to 3,616 hours.

Career Trajectory by Competitive Milestone

The previous sections of this history have provided a detailed, period-by-period account of the many factors that have shaped the ongoing development of Kennedy’s elite-level curling expertise. This final section will summarize his career trajectory in relation to

five key competitive milestones (i.e., first pre-men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded men's major title). These milestones form the basis of Table E.10, which shows his age and years of experience in each case.

Table E.10

Marc Kennedy's Age and Years of Experience by Competitive Milestone

Milestone	Event	Age	Years Curling
1 st Pre-Men's Major	1998 AB Provincial Juniors	15	10
1 st Pre-Men's International	2003 Winter Universiade	20	15
1 st Men's Major	2004 Players' Championship	21	16
1 st Men's International	2008 World Men's	25	20
Last Recorded Men's Major	2015 AB Provincial Men's	32	27

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

This table shows that Kennedy had been curling for 27 years as of the time of data collection (i.e., the end of the 2014-15 season), and confirms that he has been quite successful during these years. However, as has been demonstrated throughout this history, Kennedy's success has been the product of a substantial investment in curling training and competition over the course of his career. With this in mind, Table E.11 summarizes his cumulative investments in these activities in relation to the five competitive milestones that have just been discussed.

Table E.11

Marc Kennedy's Cumulative Curling Training and Competition Hours by Competitive Milestone

Milestone	Training	Competition	Overall
1 st Pre-Men's Major	928	606	1,534
1 st Pre-Men's International	3,654	1,770	5,424
1 st Men's Major	4,288	2,001	6,289
1 st Men's International	7,105	3,051	10,556
Last Recorded Men's Major	12,676	4,983	17,659

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

It is noteworthy that by the time he had won his last recorded men's major title, Kennedy had invested 12,676 hours in curling training, 4,983 hours in curling competition, and 17,659 hours in curling overall. It is also noteworthy that his hourly investments grew steadily as he achieved each of these milestones, which is indicative of a serious long-term commitment to the sport. For a more detailed breakdown of this commitment, please see Table E.12, which includes cumulative data on each type of curling training and competition in relation to all five competitive milestones.

Despite having won every major title that curling has to offer, Kennedy is still strongly motivated to add to his incredible record of success. "My specific goals are to win the Brier and to win the Olympics as a Third", he says. "I've done those things as a Second, but playing Third feels new to me. Its a whole different challenge." However, as always, Kennedy recognizes that curling is a team sport, so he is currently focused on doing his part to help his new team improve. "In all honesty, we underperformed as a team last year. So, our main focus now is to improve on the areas that led us to underperform," he explains.

“We’d like to qualify for the 2017 Olympic Trials, and to be a top-3 team on CTRS next season. Its going to be challenging, but I think those things are realistic.”

Table E.12

Marc Kennedy's Cumulative Curling and Other Sport Hours by Competitive Milestone

Category>	Curling Training					Curling Competition			Curling	Other Sports	Combined
Milestone	Technical	Tactical	Physical	Mental	All	League	Event	All	All	All	All
1 st Pre-Men's Major	372	128	240	188	928	300	306	606	1,534	1,595	3,129
1 st Pre-Men's International	702	500	1,176	1,276	3,654	771	999	1,770	5,424	2,917	8,341
1 st Men's Major	806	599	1,320	1,564	4,288	771	1,230	2,001	6,289	3,072	9,361
1 st Men's International	1,314	1,179	1,896	2,716	7,105	771	2,280	3,051	10,556	3,392	13,948
Last Recorded Men's Major	2,319	2,433	3,192	4,732	12,676	771	4,212	4,983	17,659	3,616	21,275

Table E.13

Marc Kennedy's Pre-Men's Major Titles and Top-3 Finishes

Age	Season	World Juniors	Canadian Juniors	Provincial Juniors	Canada Games	University Nationals	World Universiade
15	1997-98	N/A	X	1	N/A	N/A	N/A
16	1998-99	N/A	X	1	N/A	N/A	N/A
17	1999-00	N/A	DNP	3	1	N/A	N/A
18	2000-01	N/A	X	1	N/A	X	N/A
19	2001-02	N/A	DNP	X	N/A	3	N/A
20	2002-03	N/A	DNP	2	N/A	X	1
N/A	Titles	N/A	0	3	1	0	1
N/A	Top-3's	N/A	0	5	1	1	1

Table E.14

Marc Kennedy's Men's Major Titles and Top-3 Finishes

Age	Season	Olympic Games	Olympic Trials	Men's Worlds	The Brier	Men's Provincials	Canada Cup	Players' Grand Slam	Can. Open Grand Slam	National Grand Slam	Masters Grand Slam
21	2003-04	N/A	N/A	DNP	DNP	X	2	1	DNP	DNP	X
22	2004-05	N/A	N/A	DNP	DNP	X	X	X	T3	X	X
23	2005-06	DNP	3	DNP	DNP	3	3	X	2	X	X
24	2006-07	N/A	N/A	DNP	X	1	2	1	1	1	X
25	2007-08	N/A	N/A	1	1	1	2	2	1	1	3
26	2008-09	N/A	N/A	2	1	1	1	T3	2	T3	X
27	2009-10	1	1	N/A	N/A	N/A	N/A	1	1	X	X
28	2010-11	N/A	N/A	DNP	X	1	2	1	X	1	X
29	2011-12	N/A	N/A	DNP	DNP	2	1	T3	X	X	3
30	2012-13	N/A	N/A	DNP	X	1	X	X	DNP	T3	X
31	2013-14	DNP	3	DNP	DNP	2	N/A	1	X	X	2
32	2014-15	N/A	N/A	DNP	X	1	X	X	T3	X	X
N/A	Titles	1	1	1	2	6	2	5	3	3	0
N/A	Top-3's	1	3	2	2	9	7	8	7	6	3

Appendix F: Brent Laing's Career History

Brent Laing has had a long and successful stay at the top of the sport, during which he has won almost every major championship that curling has to offer. In fact, as of the end of the 2014-15 season, Laing had a total of 10 Provincial Men's titles, 12 Grand Slam, and a Canada Cup to his credit. His teams have also held the number one ranking on the Canadian Team Ranking System (CTRS) at the end of two different seasons, and have never finished lower than sixth since the system was created in 2006-07. However, the crowning achievements of Laing's career to date came in 2007 and 2012 when he won both the Canadian and World Men's Championships. A complete record of his competitive accomplishments has been included at the end of this history (see Tables F.13 and F.14).

Laing was born in the small town of Meaford, Ontario on December 10, 1978, and grew up there with his parents George and Jane, and his younger sister Jessica. At age-15, he and his family moved to nearby Stayner, where he attended Collingwood Collegiate Institute. Laing then went to Wilfrid Laurier University, earning a Bachelor of Arts degree in Geography in 2002. He then worked in the golf industry for five years, the last three as an Assistant Professional at the Grandview Golf Club in Huntsville, Ontario. In 2007, when it became clear that advancing in the golf industry would mean major compromises to his curling career, Laing returned to the family lawn care business where he has remained ever since. He recently married Jennifer Jones, the Skip of the 2014 Olympic Champions. Laing and Jones live in Collingwood, Ontario with their daughter Isabella, and Laing's son Wil.

Note: All quotations in this history were drawn from Brent Laing's Curling Life Story. Retrieved from <http://www.curlinglifestories.ca>.

Period 1: Start of Curling to End of Juniors

Laing's introduction to curling came at age-9 as part of his school physical education class. However, the fact that both of his parents curled regularly helped to reinforce this introduction. "The first bonspiel I played in was the Meaford Christmas 'Spiel, I would have been probably 9 or 10 years old. I remember playing with mom and dad, and playing Lead," he says. "And, getting that feedback from others like, 'Wow, you're pretty good at this.'" By the time he reached age-12, Laing was sparing regularly in adult leagues at the Meaford Curling Club. "Somebody wouldn't show up to the game, and I would just jump in and play. Sometimes I'd get two games in a night," he recalls. "I loved to be at the club, and the people there were fantastic. It was just a great place to grow up."

These adult interactions aside, the real key Laing sustained involvement in curling during these early years of his career was his best friend BL Teammate 1, who would be his teammate for the next 11 seasons. Laing and BL Teammate 1 had success at the district level from when they first started to compete, but their breakthrough came when they qualified for their first Ontario Junior Provincials when Laing was age-15. "Just getting to go to St. Catharine's and playing against guys who we thought were unbeatable," he remembers. "Guys like [BL Teammate 4], who happened to be the best Skip at the time in juniors." However, despite being considerably younger than most of the other curlers in the field, their first Junior Provincials turned out to be more than just an experience. "We had a chance to make the playoffs," Laing says. "So, just showing that we belong. That's something I'll always remember, because it was a big moment."

Laing and BL Teammate 1 would eventually join forces with BL Teammate 2, who would end up being Laing's teammate for the next 18 years, and BL Teammate 3, who

would be their Skip for back-to-back Canadian and World Junior titles. Laing has vivid memories about the team's first championship run, and all the emotions that came with it. "Jumping around like crazy kids, I'll never forget that," he says in recalling the team's celebration after winning their first Canadian Juniors. "Then, the World Juniors in Thunder Bay, the first time wearing the Canadian colors, and at the time feeling like a million people were watching." However, it was their second championship season that really forged Laing's future competitive mindset. "It was more of us solidifying what we had done, and proving that we were as good as we were showing," he explains. "Now being the heavy favorites to win, and being able to do it under that pressure. That's something I'm super proud of and always look back on with pride."

These two seasons also showcased some highly impressive personal performances at the Lead position, which is the one that Laing was playing at that time. These performances are confirmed by Table F.1, which compares his shooting accuracy at the Canadian Juniors to the established positional standards from that event. As indicated in this table, Laing ranked first among the 13 Leads in the field at both his Nationals, with the 89% shooting accuracy that he recorded in 1999 being an incredible 10% higher than the positional average.

Table F.1

Brent Laing's Shooting Accuracy at the Canadian Juniors vs. Positional Standards: Period 1

Age	Season	Laing's Rank	Laing's %	Position Best	Position Average
19	1997-98	1	82%	82%	74%
20	1998-99	1	89%	89%	79%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Laing leaves no doubt that these impressive personal performances were a direct result of hard work. “Whenever I got into something, I got into it with everything and committed everything to it,” he says. This commitment is evident from Table F.2, which details the hours he invested in different forms of curling-related training and competition before age-21. As you can see from this table, Laing spent 3,378 hours in training and 2,325 hours in competition during this period, for a combined investment of 5,703 hours during Period 1.

Table F.2

Brent Laing’s Curling-Related Training and Competition Hours: Period 1

Period 1		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
9-11	45	0	0	0	0	0
12-14	297	132	0	420	594	108
15-17	132	165	0	420	396	405
18-20	297	480	150	840	66	756
Period 1	771	777	150	1,680	1,056	1,269

Note. Laing invested 3,378 training hours and 2,325 competition hours, for a total of 5,703 overall curling-related hours during Period 1.

It is important to recognize that Laing’s development during this period was far from a solitary undertaking, but rather involved shared experiences with several key teammates. More specifically, beyond his previously mentioned partnership with BL Teammate 1, he also acknowledges the contributions of his other junior championship teammates, beginning with BL Teammate 2. “Having played with him for 18 years, and having gone through so many different stages and so many ups and downs, [BL Teammate 2] has probably been the teammate who’s had the biggest influence on my career,” he says.

However, at this particular stage of his career, BL Teammate 3 might have had an even bigger impact on Laing's development. "[BL Teammate 3] was the one who helped me learn how to win. Not that we didn't know how to win before, but he had this belief that he's just been born with, I think, on how to have that killer instinct."

Laing also appears to have taken a lot from his coaches during these years, beginning with his first coach, BL Coach 1. "He was up to date on the coaching things with Curl Ontario," Laing explains. "He was a pretty good technical coach, so by that time, not to say that I had everything mastered, but it was pretty permanent." Laing also acknowledges the contributions of BL Coach 2 and BL Coach 3, who were the co-coaches on his first junior championship team. "Although very different in the way that they coached, they were both coaches of ours and they taught us a lot," he says. "[BL Coach 2] about that killer instinct, and that belief in yourself. The idea that, 'You can do anything.' [BL Coach 3] in a real analytical way of, 'What's the best strategy here?' 'What's your best percentage?' 'What's your best chance of winning?' "

The above-mentioned coaches and teammates contributed to Laing's development in different ways, beginning with the technical side of that development. "I think most of my technical skills were cemented by the time I was 15," he says. "It was just by throwing thousands of rocks with Andy, and him saying, 'You were a little wide', or 'You set that one', or whatever it was. Always trying to simplify the slide, never trying to make it too complicated." If technical adjustments were ever required, Laing felt quite comfortable in having BL Coach 1 help him with those adjustments. However, it appears that the majority of the 770 technical training hours that he accumulated during this period were spent working on finesse shots with the BL Teammate 1. "In most of our practices [BL Teammate

1] and I would play Skins, or we certainly wouldn't be throwing a lot of hits," Laing says.

"We always practiced the '[Ontario Team] shots'. That's who we grew up watching, that's who we grew up idolizing, and that's who we wanted to mimic to make those shots."

As it relates to his 777 hours of tactical training, Laing clearly benefited from the on-ice component, including the series of weekend training camps that were held in his years with BL Teammate 3. However, the off-ice component of this training, and specifically watching televised curling, seems to have played an even bigger role in his development. "Most of what I've learned about curling has been through experience, and when I was young, watching on TV. Watching the [Ontario Team]," Laing says. "We were always aggressive, and took some heat from our parents about being too aggressive. But, that's the way we saw it played on TV, and that's the way we wanted to play." Then, a few years later, when he was playing with BL Teammate 3, competition appears to have taken on the key role in his tactical development. "That's where BL Coach 3, one of our coaches at the time, had a big influence," Laing explains. "He always had the plans of what to do, and what you're trying to avoid."

As far as his physical development is concerned, it should be noted that the 150 physical training hours that Laing accumulated during this period all occurred during its final three years. "We went to Ottawa and did the flexibility testing, and we did the VO₂ max," he recalls. "Then, they put together these programs for us. I got into that a little bit." With this said, it does not appear that Laing was a slave to this program, but rather focused on activities that were convenient and enjoyable. "Whether that was playing ball hockey or baseball, or continually running and mountain biking," he says. "Just trying to stay active has always been a part of it."

Finally, in terms of his mental development, Laing had some professional guidance during the latter years of this period. “We got involved with our first sport psychologist experience when I was 18 or 19, with BL Mental Trainer 1 in Ottawa,” he explains. “We sat down and worked with her a little bit and just talked about things.” However, it appears that the majority of the 1,680 mental training hours that Laing accumulated during this period were focused on personal reflection and self-study. “I was into golf at the time, so I was reading all the Bob Rotella books,” he recalls. “Anything I could get my hands on, anything that anybody could recommend about sports psychology, especially as it related to golf. There weren't very many specific to curling at the time, and still aren't that many.”

In addition to his involvement in curling, Laing was competitive in several other sports during this period, namely fastball, hockey, golf, and volleyball. Along these lines, Laing offers some insight into his athletic learning. “Still to this day, I pick up sports fairly quickly. Not to say that I'm great at everything, but there aren't very many things physically that I can't pick up,” he says. “I'm pretty good at watching something and then being able to do it. Watching is the way I learn. If I see somebody do it properly, I can usually mimic them fairly well, and that's what I did.” In addition to cultivating his athleticism, Laing also appears to have learned a lot about team skills from his other sport involvement. “Every team sport relates to any other team sport in my experience,” he explains. “The things I learned about being part of a team, and relying on other people, certainly carried into curling further down the road.”

Laing also poured a considerable amount of time and energy into these sports during this period. This reality is apparent from Table F.3, which summarizes the training and competition hours he invested in all sports other than curling before age-21. As this

table indicates, Laing invested a total of 4,284 hours of involvement in other sports during Period 1. It should be noted that this total represents over three-quarters of the 5,703 curling-related hours that he accumulated during this same period, which is indicative of the importance he gave to other sports during these early years of his career.

Table F.3

Brent Laing's Other Sports Training and Competition Hours: Period 1

Sports >	Provincial (Fastball, Golf)		Local (Hockey, Volleyball, Other)	
Ages	Training	Competition	Training	Competition
6-8	108	108	300	114
9-11	162	216	825	114
12-14	216	424	975	145
15-17	0	0	159	135
18-20	54	229	0	0
Period 1	540	977	2,259	508

Note. Laing invested a total of 4,284 other sport hours during Period 1.

Period 2: Start of Men's to 2007 World Men's Championship

Laing's transition into men's play was a relatively smooth one, winning his first men's major title, the 2002 Ontario Men's Championship, at age-23, with BL Teammates 2, 3, and 4. Laing and his teammates then advanced all the way to the 2002 Brier final, before bowing out to Alberta. They then followed up with top-three finishes at both the Canada Cup and the Players' Championship the next season, and seemed poised for an ascent on the top of the sport. However, at the end of that season BL Teammate 3 decided to move to Alberta, which forced Laing to play on a transitional team for the 2003-04 season.

However, in 2005-06 Laing and BL Teammate 2 joined forces with two-time World Champion, BL Teammate 5 and 1998 Olympian, BL Teammate 6 to form what would become one of the dominant teams in curling history. The team would amass 14 top-three finishes in major events over the next three seasons, including victories at the 2007 Ontario, Canadian, and World Championships. However, when asked about winning these titles, Laing indicates that they were fueled by losing the Brier final in 2006. “Nobody wants to say they choked, but we choked. For sure we did,” he says. “Call it whatever you want, but we didn’t play well.” In Laing’s view this failure set the stage for their success the following season, and helped to make what they achieved that much more gratifying.

“It was just like those kids jumping around in ‘98 winning their first Canadians,” Laing recalls. “Winning your first Brier is just unreal. Then we got to wear the Canadian Maple Leaf again, and we got to go to Edmonton for another home Worlds.” The team would put together an outstanding week at the 2007 Worlds, and were most deserving of their victory. “That’s the best week we probably ever had as a team,” he recalls. “That’s the experience factor, and that’s the part about knowing why you lost, and how to not do that again. Learning from your mistakes. You can’t buy that.”

Upon joining his championship team Laing moved from Lead to Second, but this did not hinder his personal performances. This is evident from Table F.4, which compares his shooting accuracy to the established positional standards from the three Briers that he competed in during this period. As you can see from this table, Laing only ranked sixth among the Leads at his first Brier, but improved his ranking to second and fourth in his final two Briers of this period when he was playing Second. To give these numbers some context, there are 12 teams in every Brier, and therefore 12 players at each position.

Table F.4

Brent Laing's Shooting Accuracy at the Brier vs. Positional Standards: Period 2

Age	Season	Laing's Rank	Laing's %	Position Best	Position Average
23	2001-02	6	86%	90%	85%
27	2005-06	T2	86%	87%	79%
28	2006-07	4	83%	85%	81%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

Laing's solid personal performances in these Briers were the product of an ongoing commitment to training and competition that continued during this period. This is evident from Table F.5, which details the hours that Laing invested in various developmental activities in these middle years of his career. As this table indicates, he invested 4,184 training hours and 2,286 competition hours, for a combined total of 6,470 hours during Period 2. This brought Laing's cumulative totals to 7,562 training hours, 4,611 competition hours, and overall 12,173 curling-related hours.

Table F.5

Brent Laing's Curling-Related Training and Competition Hours: Period 2

Period 2		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
21-23	297	336	150	840	0	756
24-26	297	246	150	840	60	882
27-28	154	164	150	560	0	588
Period 2	748	746	450	2,240	60	2,226
Cumulative	1,519	1,523	600	3,920	1,116	3,495

Note. Laing invested 4,184 training hours and 2,286 competition hours, for a total of 6,470 curling-related hours during Period 2. At this point his cumulative totals sat at 7,562 training hours, 4,611 competition hours, and overall 12,173 curling-related hours.

In Laing's view, BL Teammates 5 and 6 facilitated his ongoing development during this period. However, rather than any advice or direction that that might have offered, it appears that he learned primarily by observing these players in action. "I don't know anybody else who's played more games, and been in more situations, than [BL Teammate 5]," he says. "He was also a guy that played through the few mini-slumps that he ever had, played through them better than anybody I ever played with. I think that was just because technically he was so good that he always relied on that." In contrast to BL Teammate 5's technical excellence was BL Teammate 6's creativity, and Laing believes he may have learned even more from watching the latter. "[BL Teammate 6] was more of an artist, and more of a shot-maker by feel," Laing explains. "How he manages the rock, which is what the game's all about. His feel is unmatched as far as I can tell."

Despite the fact that they were considerably older and more accomplished than he and BL Teammate 2, Laing also credits BL Teammates 5 and 6 with facilitating a strong and stable dynamic within the team. "It was a great run. That first couple of years with [BL Teammates 5 and 6], we had so much fun right away and got along so well off the ice," he says. "We just became a team in every sense of the word and I'm super proud of that." However, beyond the contribution that his teammates made to him, Laing prides himself on what he is able to give back to them. "On my bad days I want to still be able to make the team better, and that might be by saying the right thing at the right time," he explains. "To know when they're not themselves, and to know what to say or what to do to get them back to being the player they are."

Laing also speaks very highly of his longtime team coach, BL Coach 4, who was with him for 16 consecutive years. Although BL Coach 4 typically only traveled to Provincials

and Briers with the team, it appears that everyone valued his contribution when he was around. “He was a sounding board for us”, Laing says. “Anything we needed, anything we wanted to talk about, and any ideas we had.” Interestingly, Laing does not characterize Taylor as being an expert in a specific aspect of the sport, but rather as a highly capable facilitator and manager. “He was the guy who would track down people if he didn’t know, or felt that he wanted an expert’s opinion,” he says. “[BL Coach 4’s] a guy who gets things done, and gets things done properly.”

As far as his technical development is concerned, Laing points out that the great majority of the 748 technical training hours that he accumulated during this period were spent alone. “In terms of practicing I would generally try to get down to the club on my own about three times a week,” he says. “Then if I wanted some technical help I would ask [BL Teammate 5] to come out with me, but honestly that didn’t happen a whole bunch.” However, beyond his training, it appears that competition also played a role in his technical development. More specifically, beyond observing his teammates in action, he also appears to have learned from his opponents, “You play against Marc Kennedy and all of a sudden he’s making every run-back,” he explains. “You learn what it takes to make a run-back. If your run-back curls, you’re not going to be as good at it as somebody else. You’ve got to learn how to throw it so it doesn’t do that.”

With respect to his tactical development, it should be noted that over two-thirds of the 186 hours of tactical training hours that Laing accumulated during this period occurred during its first three years, when he was still playing for BL Teammate 3. This is because the four members of his championship team lived in different parts of the Ontario, which made it difficult to get together for practices. “You know, in the 10 years we were together,

I don't think we had 10 team practices," he points out. "All of our tactical training was after our games in our de-briefs and our chats about what we did here and what we did there."

Building on this theme, it seems that Laing also developed during his team's games themselves. "I've always prided myself on knowing what's going on," he says. "I think I got even better at that when I started to play and learn from [BL Teammates 5 and 6]. That was something I always really enjoyed, how much we discussed all the shots and how it was so open for suggestions."

As for his physical development, it appears that the 450 physical training hours that Laing accumulated during this period were utilized similarly to his junior years. This was due to the demands of his career in the golf industry, which left him with very limited time in the off-season. "That was the time I was trying to get my card, so I needed to play lots of golf," Laing says. "I tried to do what I could on the side. Whether it be some bodyweight work, like sit-ups and push-ups and box jumps and lunges, and those kinds of things that you can do anywhere." It should be noted that this approach continued during the curling season itself, when Laing placed a higher priority on other aspects of his development. "There are only so many hours in a day," he explains. "There are so many things to improve on in curling, and so many aspects of the game, that you have to pick and choose."

Finally, with respect to his mental development, it appears that the 2,800 mental training hours that Laing accumulated over this period were entirely self-directed. To this end, and in addition to regular personal reflection, and maintained the same reading habits that he had in his junior years. "I continued to read any golf books or sport psych books that people would recommend, Laing says. "I'd take notes and photocopy pages here and there. That was definitely continuing." He also applied a mental technique he had learned

from one of his golf mentors, BL Golf Coach 1, to the sport of curling. “He always used the analogy of a computer screen. Once you hit that shot, or once you throw that rock, the shot is gone and done. You minimize that computer screen, and it's done,” Laing explains. “I think that’s helped me in those moments to really let go of anything that I can't control and focus on the things I can, and accept whatever happens from there.”

Any account of Laing’s athletic development during these years would be incomplete without examining his involvement in golf. Although it was never one of his main sports during his junior years, he made the improbable decision at age-21 that he wanted to become a club professional. “All the things I ever did in my life I was able to do. Why would this be any different?” he asks. “I was naturally pretty good at golf. I naturally had a good swing, again just through watching and learning, and then got a little bit of instruction.” That instruction came from BL Golf Coach 1, who was a teaching professional at a golf course in southern Alberta, where Laing had been hired for a summer job. “BL Golf Coach 1” gave up his time every week to give lessons to anyone that worked at the golf course and wanted to be in the golf business,” he recalls. “He was an amazing dude, and he helped me a lot with course management, and the mental game of golf.”

As beneficial as this instruction might have been, it was only available to Laing for one of the four summers from when he started to work on his game to when he earned his CPGA card. Therefore, he was largely on his own in terms of his golf-related development efforts. These efforts are evident from Table F.6, which summarizes the training and competition hours that Laing spent on other sports during Period 2. As is indicated in this table, he invested total of 1,584 hours in other sports (and specifically in golf) during these middle years, which brought his cumulative total to 5,868 hours to this point in his career.

Table F.6

Brent Laing's Other Sports Training and Competition Hours: Period 2

Sports>	Provincial (Golf, Fastball)		Local (Hockey, Volleyball, Other)	
Ages	Training	Competition	Training	Competition
21-23	162	432	0	0
24-26	162	432	0	0
27-28	108	288	0	0
Period 2	432	1,152	0	0
Cumulative	972	2,129	2,259	508

Note. Laing invested 1,584 other sport hours during Period 2, bringing his cumulative total to 5,868 hours.

Period 3: After 2007 World Men's Championship to 2014-15 Season

In the seven seasons after their 2007 World Championship, Laing and his teammates amassed a tremendous record of competitive success. In fact, over this span they managed to win nine Grand Slam titles, a Canada Cup title, and a record eight consecutive Ontario Men's titles. They also finished first on the year-end CTRS rankings on two occasions, and most notably captured the 2012 Canadian and World Championships. Although he was quite proud of both of these championships, Laing points to some key differences between the two. "When you don't win the Brier it is like 'We lost to a Canadian team'. There so many great teams in Canada, and it's such a hard event to win," he says. "But, when you go to the Worlds you are Canada. You're the only ones that have the chance to win or lose for Canada that year. There's so much pressure that comes with that."

For all of their accomplishments the team also encountered considerable adversity during this period, with a good amount of it coming 2009-10. "A big one was when we lost the Trials final to Martin, which sucked since that only comes once every four years, and we'd worked so hard to get there," he says. "When we faced them in the final, we just didn't

play very well. They did, they won, and they deserved to win. And, the rest is history.”

Despite their disappointment, the team put together an incredible 24-0 record through the Ontario Provincials and Brier later that season, before losing an epic Brier final to Alberta.

“Yes, it was heart breaking, but there’s pretty much two choices that you have in those situations,” Laing explains. “You can dwell on it, and think about ‘woulda, coulda, shoulda,’ or you can move on and think about how do we do better next time.”

At the end of the 2013-14 season Laing decided to leave Teammates 2, 5, and 6, to join a new team with Marc Kennedy, and Teammates 8 and 9. “After all those years with Teammate 5 and the guys, it’s been a big change to move on to our new team,” he says. “Last year was a ton of fun. We learned a lot, and we had some success.” It should be noted that Laing played somewhat different position in his first year with the new team than he has previously. Although he was still throwing Second’s rocks, he was also the team’s Vice-Skip, and therefore worked directly with Teammate 8 to help him select and manage the final shots of the end. “My role is a little bit different. Being in the house comes with some other responsibilities,” Laing says. “I would call it a caddie. I mean if you’re talking to the Skip, you might as well be telling him the right stuff, and making him better.”

Beyond these contributions, Laing posted outstanding personal performances during this period, demonstrating that he was now unquestionably world-class as a shot-maker. This is confirmed by Table F.7, which compares his shooting accuracy to the positional standards established at the eight Briers that were held during this period. As you can see from this table, Laing has never ranked outside the top-three among the 12 Seconds that have made up each of these Brier fields, and has been the highest ranked

Second on three occasions. It is also noteworthy that the 93% shooting accuracy that he posted in 2012 was not exceeded by any Second during this entire period.

Table E.7

Brent Laing's Shooting Accuracy at the Brier vs. Positional Standards: Period 3

Age	Season	Laing's Rank	Laing's Accuracy	Position Best	Position Average
29	2007-08	2	89%	93%	82%
30	2008-09	T3	85%	91%	81%
31	2009-10	1	88%	88%	82%
32	2010-11	T3	86%	90%	82%
33	2011-12	2	87%	89%	82%
34	2012-13	1	93%	93%	85%
36	2014-15	1	91%	91%	85%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

These outstanding personal performances were the product of a carefully considered improvement program that Laing followed throughout this period. "Its a sport that you'll never master. You can call yourself a master, but there's always something you can get better at," he explains. "Over the last five or six years I've gotten better at a lot of things, and I continue to." Laing's ongoing development efforts are apparent from Table F.8, which details the hours that he invested in different forms of training and competition during this most recent period of his career. As this table indicates, he invested 4,915 training hours and 2,352 competition hours during Period 3, for a total of 7,267 curling-related hours. This brought his career totals to 12,477 training hours, 6,963 competition hours, and 19,440 overall curling-related hours as of the end of the 2014-15 season.

Table F.8

Brent Laing's Curling-Related Training and Competition Hours: Period 3

Period 3		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
29 Only	77	82	75	280	0	294
30-32	132	246	225	840	0	882
33-35	132	742	450	840	0	882
36 Only	44	295	175	280	0	294
Period 3	385	1,365	925	2,240	0	2,352
Career	1,904	2,888	1,525	6,160	1,116	5,847

Note. Laing invested 4,915 training hours and 2,352 competition hours, for a total of 7,267 curling-related hours during Period 3. As of the end of the 2014-15 season, he sat at 12,477 training hours, 6,963 competition hours, and 19,440 overall curling-related hours.

After the 2010-11 season championship team's longtime Third, BL Teammate 6, decided to step away from the sport, and was replaced by former World Champion Skip, BL Teammate 7. Although Laing had always looked up to BL Teammate 6, and had appreciated his technical artistry and low-key manner, he picked up some different things from BL Teammate 7. "[BL Teammate 7] brought a swagger and an intimidation factor with what he has done in his career. Especially guys who are around my age, they watched him growing up," he says. "He's a guy that would do anything for his teammates, and I can't say enough about playing with him." He was also impressed with BL Teammate 7's confidence level, and with the quality of his personal performances. "Obviously, as a shot-maker, there isn't a shot he can't make, and there isn't a shot he doesn't think he can make," Laing explains. "He thinks he can make every shot. That's a great attitude, and just fun to be around."

Laing a new curling advisor for the last five years of this period, namely his life partner, 2014 Olympic Champion Skip Jennifer Jones. "When I want to talk or bounce ideas

off someone, I can now do that with the person I live with," he explains. "Certainly she knows as much about curling as anybody, maybe ever, so it's great for me." Beyond benefiting from her curling acumen, Laing and Jones also practice together as often as they can. "I've practiced on my own for so long. Not that we're always in the same place at the same time, but practice-wise she pushes me," he says. "She certainly has had better practice habits than I've had traditionally. I've now adopted those, and we have a great routine we go through."

Therefore, it is safe to say that that a significant portion of the 385 technical training hours that Laing accumulated during this period were used differently than they might have been in the past. With this said, the content of this technical training appears to have been strongly influenced of his competitive experiences. "If you only take one thing away from playing with a team like that, the one thing I would take away is that curling is a technical game, and the better you throw a technically the easier it is," he says. "There's no question about it. I've always been a big believer in that, and I've worked hard at that." However, as important as these considerations may be, Laing's competitive experiences have led him to believe that weight control is perhaps even more important. "Curling is a game of how hard you throw the rock more than anything else. If you throw the right weight, you don't have to be anywhere near perfect," he contends. "That's what Teammates 6 and 5 taught me, they are just so good at that. That's what I learned from them and, that's when I became better."

As it relates to his tactical development, the 1,365 tactical training hours that Laing accumulated during this period were largely the product of curling observation, since his championship team's tactical practices continued to be few and far between. However, it

should be noted that this latter reality changed considerably since joining his new team. “There’s certainly more of a structure about how we get together. We do the mini-training camps before the big events,” he says. “There’s also a lot more chatter about game plans before games and after games in our meetings and debriefs, because we are trying to figure out how we play.” Along these lines, Laing notes that it takes time for any new team to come together, no matter how promising it may be. “The four of us came from three different teams, and one of the challenges is realizing this is a new team,” he explains. “Not commenting about, ‘This is what we used to do.’ But, trying to create new norms and new habits, and a new we.”

In terms of his physical development, it appears that the great majority of the 925 physical training hours that Laing accumulated during this period were focused on the same generally active approach that he employed in the previous period. However, this situation seemed to have changed considerably in his time his new team. “I have worked out more in the last 18 months than I have ever in that amount of time. It’s absolutely motivating,” he says. “I don’t imagine that I’ll ever keep up with Teammate 9 and Marc, but I would like to get a little closer.” Laing also notes that being strong and fit is central to his new team’s brand, and this has provided him with an additional incentive to increase the intensity of his efforts in this area. “I’m on a team now where it’s part of our trademark, and part of what we do,” he explains. “We want to make sure that that’s not something that we are lacking in, and it’s become a big part of our game for sure.”

As far as his mental development is concerned, it appears that the most of the 2,240 mental training hours that he accumulated during this period were utilized much as they were in the previous period. In other words, focused on a combination of personal

reflection and self-study. With this said, Laing indicates that his approach to mental training evolved considerably during his first season with his new team, and that his new coach, BL Coach 5, a renowned sport psychologist, played a central role in this evolution.

“BL Coach 5 has been amazing so far. He’s a no nonsense kind of guy,” Laing says.

“Everything that he says and does comes from a logical place, which I really enjoy, and kind of relate to, and follow, and understand.”

Finally, with respect to his other sport involvement, even though was no longer a Golf Professional, he still remained active in the sport throughout this period. “Now that I’m not working in golf anymore, its really just became a hobby again,” he said. “I still play in some scrambles and some corporate stuff for curling, and play some golf with my dad and some buddies, but that’s pretty much it.” This situation is evident from Table F.9, which summarizes the extent of his other sport involvement during the most recent years of his career. As this table indicates, Laing invested a total of 960 other sport hours during Period 3, bringing his career total to 6,828 hours as of the end of the 2014-15 season.

Table F.9

Brent Laing’s Other Sports Training and Competition Hours: Period 3

Sports>	Provincial & National (Fastball, Golf)		Local (Hockey, Volleyball, Other)	
Ages	Training	Competition	Training	Competition
29 Only	18	144	0	0
30-32	18	324	0	0
33-35	18	324	0	0
36 Only	6	108	0	0
Period 3	60	900	0	0
Career	1,032	3,029	2,259	508

Note. Laing invested 960 other sport hours during Period 3, bringing his career total to 6,828 hours as of the end of the 2014-15 season.

Career Trajectory by Competitive Milestone

The previous sections of this history have provided a detailed, period-by-period account of the many factors that have shaped the ongoing development of Laing's elite-level curling expertise. This final section will summarize his career trajectory in relation to five key competitive milestones (i.e., first pre-men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded men's major title). These milestones form the basis of Table F.10, which shows his age and years of experience in each case.

Table F.10

Brent Laing's Age and Years of Experience by Competitive Milestone

Milestone	Event	Age	Years Curling
1 st Pre-Men's Major	1998 ON Provincial Juniors	19	11
1 st Pre-Men's International	1998 World Juniors	19	11
1 st Men's Major	2003 ON Provincial Men's	23	15
1 st Men's International	2007 World Men's	28	20
Last Recorded Men's Major	2015 AB Provincial Men's	36	28

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

This table shows that Laing had been curling for 28 years as of the time of data collection (i.e., the end of the 2014-15 season), and confirms that he has been quite successful during these years. However, as has been demonstrated throughout this history, Laing's success has been the product of a substantial investment in curling training and competition over the course of his career. With this in mind, Table F.11 summarizes his

cumulative investments in these activities in relation to the five competitive milestones that have just been discussed.

Table F.11

Brent Laing's Cumulative Curling Training and Competition Hours by Competitive Milestone

Milestone	Training	Competition	Overall
1 st Pre-Men's Major	2,789	2325	5,114
1 st Pre-Men's International	2,789	2325	5,114
1 st Men's Major	5,001	3,081	8,082
1 st Men's International	7,562	4,611	12,173
Last Recorded Men's Major	12,477	6,963	19,440

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

It is noteworthy that by the time he had won his last recorded men's major title, Laing had invested 12,477 hours in curling training, 6963 hours in curling competition, and 19,440 hours in curling overall. It is also noteworthy that his hourly investments grew steadily as he achieved each of these milestones, which is indicative of a serious long-term commitment to the sport. For a more detailed breakdown of this commitment, please see Table F.12, which includes cumulative data on each type of curling training and competition in relation to all five competitive milestones.

Despite having achieved almost everything there is to achieve in his curling career, on both the team and individual levels, Laing is strongly motivated by the goals that he and his new teammates have set for the future. "I still have lots of goals in my curling career. Certainly the Olympics is at the top of that list, as it is for everyone," he says. "That's the goal, the Olympics. That's what this team's been put together for, and that's what

everything we talk about is built towards.” With this said, and as motivating as this big goal is to him, Laing has not lost sight of his personal development. “Now the game has gone to an entirely different level, and I feel like I’ve gone with it, he says. “I don’t feel like I’ve lost a step. I still feel like I can compete with anybody at my position for sure. I feel like I continue to improve.”

Table F.12

Brent Laing's Cumulative Curling and Other Sport Hours by Competitive Milestone

Category>	Curling Training					Curling Competition			Curling	Other Sports	Combined
Milestone	Technical	Tactical	Physical	Mental	All	League	Event	All	All	All	All
1 st Pre-Men's Major	672	617	100	1,400	2,789	1,056	1,269	2325	5,114	4,203	9,317
1 st Pre-Men's International	672	617	100	1,400	2,789	1,056	1,269	2325	5,114	4,203	9,317
1 st Men's Major	1,068	1,113	300	2,520	5,001	1,056	2,025	3,081	8,082	4,902	12,984
1 st Men's International	1,519	1,523	600	3,920	7,562	1,116	3,495	4,611	12,173	5,868	18,041
Last Recorded Men's Major	1,904	2,888	1,525	6,160	12,477	1,116	5,847	6,963	19,440	6,780	26,220

Table F.13

Brent Laing's Pre-Men's Major Titles and Top-3 Finishes

Age	Season	World Juniors	Canadian Juniors	Provincial Juniors	Canada Games	University Nationals	World Universiade
19	1997-98	1	1	1	N/A	N/A	N/A
20	1998-99	1	1	1	N/A	N/A	N/A
N/A	Titles	2	2	2	N/A	N/A	N/A
N/A	Top-3's	2	2	2	N/A	N/A	N/A

Table F.14

Brent Laing's Men's Major Titles and Top-3 Finishes

Age	Season	Olympic Games	Olympic Trials	Men's Worlds	The Brier	Men's Provincials	Canada Cup	Players' Grand Slam	Can. Open Grand Slam	National Grand Slam	Masters Grand Slam
21	1999-00	N/A	N/A	N/A	N/A	DNP	N/A	DNP	N/A	N/A	N/A
22	2000-01	N/A	N/A	DNP	DNP	2	N/A	X	N/A	N/A	N/A
23	2001-02	DNP	X	DNP	2	1	N/A	DNP	DNP	DNP	DNP
24	2002-03	N/A	N/A	DNP	DNP	3	2	2	DNP	DNP	DNP
25	2003-04	N/A	N/A	DNP	DNP	DNP	DNP	DNP	X	X	DNP
26	2004-05	N/A	N/A	DNP	DNP	2	DNP	T3	T3	T3	DNP
27	2005-06	DNP	X	DNP	2	1	2	X	X	T3	T3
28	2006-07	N/A	N/A	1	1	1	DNP	X	X	DNP	1
29	2007-08	N/A	N/A	DNP	3	1	X	1	X	DNP	1
30	2008-09	N/A	N/A	DNP	3	1	DNP	2	1	X	1
31	2009-10	DNP	2	DNP	2	1	N/A	X	2	T3	1
32	2010-11	N/A	N/A	DNP	2	1	1	T3	2	T3	T3
33	2011-12	N/A	N/A	1	1	1	2	2	T3	1	1
34	2012-13	N/A	N/A	DNP	3	1	2	1	1	X	X
35	2013-14	DNP	X	DNP	DNP	2	N/A	X	T3	1	1
36	2014-15	N/A	N/A	DNP	X	1	X	X	T3	X	X
N/A	Titles	0	0	2	2	10	1	2	2	2	6
N/A	Top-3's	0	1	2	9	14	5	7	8	6	8

Appendix G: Nolan Thiessen's Career History

Although he arrived at the elite level of curling later than most, Nolan Thiessen's competitive record since that time is among the best in the sport. His teams have finished in the top-five on the Canadian Team Ranking System (CTRS) at the end of seven different seasons, and have never fallen out of the top-ten since the system was created in 2006-07. Thiessen's teams have also earned four Provincial Men's titles, two Grand Slam titles, and a Canada Cup title as of the end of the 2014-15 season. However, his biggest achievements to date are his 2010, 2014, and 2015 Brier titles, and most significantly his victory at the 2010 World Championship. A complete record of his competitive accomplishments has been included at the end of this history (see Tables G.13 and G.14).

Thiessen was born in tiny Pilot Mound, Manitoba, on November 6, 1980. He moved to Brandon, Manitoba when he was age-5, where he lived with his parents Bill and Debbie, and his older sister Vicki until age-17. He then spent two years playing baseball in the United States, before returning to Canada to complete his education. Thiessen eventually graduated from the University of Manitoba in 2004 with a Bachelor of Commerce degree. He relocated to Edmonton, Alberta where he became a Chartered Accountant, and then spent five years working for a large accounting firm. In 2012 Thiessen started his own accounting consultancy so he could spend more time on curling. He married his wife Christine in 2011. The couple currently lives in Spruce Grove, Alberta with their son Mason, and Christine's daughters Taylor and Tyra.

Note: All quotations in this history were drawn from Nolan Thiessen's Curling Life Story. Retrieved from <http://www.curlinglifestories.ca>.

Period 1: Start of Curling to 2001 Canadian Junior Final

Although he did not start curling until age-11, Thiessen was in fact exposed to the sport several years before that. “We only had one TV in our house, and my parents pretty much let my sister and I determine what was on,” he recalls. “Except for the weekend of the Brier. My parents would put it on the Brier, and we weren’t allowed to change the channel.” Thiessen was an avid sports fan, and he really looked up to the athletes he watched on television, so curling became a natural extension of that. Then, at age-11, he watched Manitoba win the Brier, and he was inspired to try curling himself. “So, I wanted to go and start curling, and the Wheat City Curling Club was only five minutes from my house”, he says. “I could go down there and throw whenever I wanted to. That’s how I got into the whole curling thing, how I got bit by the curling bug.”

By the next season, Thiessen was curling two after-school leagues, and was continuing to practice on his own. Then, at age-15 he received some additional inspiration when the World Curling Championships came to Brandon, with a Manitoba team representing Canada and eventually winning gold. That event was the impetus that Thiessen needed to join a twice-a-week men’s league at the Brandon Curling Club, and to begin to take the sport more a little seriously. However, despite playing and sparing on a regular basis, he was not involved in a formal curling development program of any kind. “Not a lot a lot of coaching, no curling camps, nothing like that,” he says. “Just playing and getting to know the game.”

It is important to recognize that at this point in his career, Thiessen did not consider curling to be his main sport. “Honestly curling was still just something to do in the winter until baseball season started,” he says. “I was still chasing the baseball dream.” To this end,

at age-17 Thiessen accepted an offer to finish High School in West Monroe, Louisiana, and to pitch for their High School baseball team. This decision would lead to nearly a two-year hiatus from curling, and some vivid baseball memories. "I loved that town. I just had an awesome experience there, and we were good," he explains. "We were killing teams. We lost in the State Finals." On the basis of those performances, Thiessen received an athletic scholarship to play baseball for Vernon Junior College in Texas, where he struggled to some extent in his first season. This led his coach to revoke his scholarship, and led Thiessen to make a difficult decision. "I ended up immaturely chickening out, saying 'Well, I'm never going to make it, so I'm going to stay home and get a real degree,' " he recalls. "Looking back on it, it makes me mad based on how I train now. I never trained like that back then, so it always makes me wonder how good could I have been if I had actually trained."

Although this essentially marked the end to Thiessen's baseball career, it also led to by far the best opportunity that he had in his curling career to that point. This is because fellow Brandon resident, and future elite Skip, NT Teammate 1 was looking for a Lead, and decided to include Thiessen on his junior team. "I'd never even been to Junior Provincials before," he recalls. "But, we just said, 'We're going hard, and we're going to win everything.' We ended up being super successful that year." So successful in fact that they won the Manitoba Junior Provincials, and advanced all the way to the final game of the Canadian Juniors. Although they ended up losing that game to future Olympic Champion, Brad Gushue, Thiessen looks back on that game as a turning point in his career. "That was the time when I remember thinking, 'Okay, I can do something in this sport now,' " he notes. "I think that was the thing that really drove me forward."

Even though he had been away from curling for the better part of two seasons, and was essentially playing competitively for the first time, Thiessen's personal performance was more than commendable. This is evident from Table G.1, which compares his shooting accuracy at the Canadian Juniors to the established positional standards from that event. As indicated in this table, Thiessen ranked third among the 13 Leads in the field with an 80% shooting accuracy. However, with only one Canadian Juniors appearance to his credit, it is difficult to properly assess Thiessen's evolving performance capabilities during this initial period of his career.

Table G.1

Nolan Thiessen's Shooting Accuracy at the Canadian Juniors vs. Positional Standards: Period 1

Age	Season	Thiessen's Rank	Thiessen's %	Position Best	Position Average
20	2000-01	3	80%	81%	76%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

In light of his time away from curling, and the fact that he only curled competitively for one season, it is not surprising that Thiessen's time investment in the sport was somewhat inconsistent. This is apparent from Table G.2, which provides a detailed breakdown of the hours that he invested in different forms of curling-related training (i.e., technical, tactical, physical, and mental) and competition (i.e., league and event) before age 21. As indicated in this table, Thiessen spent 2,280 hours in training and 1,050 hours in competition during this period, for a combined total of 3,330 hours. However, it should also be noted that because he spent two years in the United States pursuing his baseball career, most of these hours were accumulated over an eight-year span.

Table G.2

Nolan Thiessen's Curling-Related Training and Competition Hours: Period 1

Period 1		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
11 Only	45	0	0	0	0	0
12-14	135	0	0	0	90	90
15-17	240	30	525	0	360	270
18-20	30	55	1,080	140	60	180
Period 1	450	85	1,605	140	510	540

Note. Thiessen invested 2,280 training hours and 1,050 competition hours, for a total of 3,330 curling-related hours during Period 1.

In commenting on his junior teammates, Thiessen indicates that NT Teammate 1 was the most influential. “[NT Teammate 1] and I had a strange relationship in that I could be a little hard on him to get him going, because he could be a bit of a pouter,” he explains. “Then, there were also times when I’m like, “He’s not going to miss, so just get out of his way and sweep his rocks.” Thiessen also appears to have learned about the importance of strong group dynamics from that team. “Having as cohesive as a team as we had. That’s something that I see more and more now, the teams that are successful or teams that really get along,” he says. “That showed me some of the blueprint of what could happen.”

Beyond his teammates, Thiessen also recognizes the impact that the coach of that team, NT Teammate 1’s father, NT Coach 1, had on his development as a curler. “He did really develop and help out our team that year,” he says. We got a lot better with him.” Although he definitely did not agree with some of NT Coach 1’s other coaching methods, Thiessen does not hesitate to acknowledge the importance of his contribution. “He was the first one who we really improved with,” he says. “Up to that point he had been my only real, in-depth, curling coach.”

According to Thiessen, NT Coach 1's greatest strength was related to the technical side of the game. "He was a great reader of the technical delivery, and he could help me out quite a bit," he says. "He was my first coach that actually had structured curling practices, which I had not really ever had." With this said, since the two only worked together for one season, it is safe to say that the great majority of the 450 technical training hours that Thiessen accumulated during this period were self-directed. Along these lines, he provides some important insight into how his athleticism enhanced his ability to pick up some key technical fundamentals. "I don't know how, but I always just had balance, Thiessen says. "I don't know if I just naturally had it in me, or if it was a lot to do with playing other sports being a very athletic kid, but I could always just slide out."

It also appears that Thiessen took a relatively basic approach to his tactical development, with almost all of the 85 tactical training hours that he accumulated in this period being focused on observation. Although much of this observation came from televised games, the opportunity to attend the 1995 World Championships, which were held in his hometown of Brandon, left a lasting impression him. "I pretty much took a week off school, and just spent the entire week at Keystone Centre watching the Worlds," Thiessen says. "I was just such a huge [Canadian Skip] fan, really his entire team. I started to pay attention to how they operated out there. That's the first time when curling really started to seep in." However, outside of this unique opportunity it appears the rest of his tactical development was focused largely on his game experiences. "It was the volume of games that we played, and learning from our mistakes," Thiessen says. "It was a lot of just, 'Okay, we made this dumb call, and we lost'," he says. "That's how we tried to get better."

By contrast to somewhat limited investment in technical and tactical training, Thiessen's spent considerable time and energy to his physical development. In fact, it should be noted that the 1,605 hours that he accumulated in physical training represents over 70% of his overall training hours during this period. This is largely due to his commitment to baseball, which is what led him to begin working out at age-17. However, the great majority of Thiessen's physical training hours occurred when he was playing college baseball, and was part of an extensive and highly structured training regimen. "We worked out a lot when I was down there at college," he says. "We trained three days a week in the pool, and three days a week in the gym for six in the morning training."

Thiessen's commitment to baseball also helps to explain why his mental training investment was only 140 hours during these early years of his career. To clarify, this is because he did not have the opportunity experience any formal mental training until the next period of his career, and because his personal reflection was entirely focused on baseball for the great majority of this period. With this said, Thiessen did do some baseball-related reading that is reflected in this total. "I started reading baseball books when I was about 16 or 17," he says. "I remember reading the 'Mental Game of Pitching', for example. That was one of the books I read." Also included in this total is the curling-related personal reflection that he did at age-20 when he started playing with NT Teammate 1. "That year I probably spent about an hour a day just thinking about curling," he says. "And, I'd say that lasted for the full season."

However, prior to that point baseball was definitely Thiessen's number one sporting priority, and his comments suggest exactly where it sat in relation to curling. "Honestly curling was still just something to do in the winter until baseball season started," he says.

“In my early curling years, I would still train for baseball. I was throwing in gyms in the winter.” Based on this commitment it is not surprising that Thiessen enjoyed considerable success in baseball even before moving to the United States. In fact, he represented Manitoba on several occasions, including in the 2001 Canada Summer Games.

However, the fact that baseball was his main sport does not mean it was the only sport that he participated in. More specifically, as indicated in Table G.3, Thiessen was also quite active in hockey and golf during these early years of his career. When these activities are taken into consideration, his total other sport investment during Period 1 was 5,409 hours. It is also be noted that this is considerably more than the 3,330 hours he invested in curling during this same period.

Table G.3

Nolan Thiessen’s Other Sports Training and Competition Hours: Period 1

Sports > Ages	Provincial & National (Baseball)		Local (Hockey, Golf, Other)	
	Training	Competition	Training	Competition
4-5	294	54	N/A	N/A
6-8	441	81	375	225
9-11	441	177	375	225
12-14	315	177	300	339
15-17	90	390	0	480
18-20	114	414	0	102
Period 1	1,695	1,293	1,050	1,371

Note. Thiessen invested a total of 5,409 other sport hours during Period 1.

Period 2: Start of Men’s to 2010 World Men’s Championship

Despite his accomplishments in his final year of juniors, Thiessen found it difficult to gain any traction at the outset of his men’s career. I went into men’s thinking, ‘Okay, this is

what I want to do,' but then never got on great teams," he says. "I was always playing on the local circuit in Manitoba, not really playing enough to get anybody's attention that was any good." This situation began to change when his former junior Skip, NT Teammate 1, won the 2002 Canadian University Championship, and added Thiessen to his 2003 Universiade roster at Lead to replace a player who did not meet the established age requirements. Although the team started out slowly at Universiade, a mid-week line-up change that moved Alternate Marc Kennedy to Third helped to propel the team to the gold medal. This accomplishment, and the overall Universiade experience, appears to have left a lasting impression on Thiessen. "Universiade turned out to be a big thing for me," he says. "It was that national pride, and wanting to do that again."

Thiessen's connection to Kennedy also proved to be quite important to his ongoing development, since it was Kennedy who helped to get Thiessen onto his first high-level men's team when he moved to Edmonton. That team included Kennedy's brother Glen at Second, along with tour veterans NT Teammate 2 and 3 at Third and Skip respectively. After a solid initial season, Thiessen's new team won several tour events their second year together, and then had a great run at the Alberta Provincials. "We beat [Champion Skip 1] and we beat [Champion Skip 2] that week, and we ended up being in the final," says Thiessen. "We played a great final, but lost on last rock to [Champion Skip 2]."

"When we lost that final, I made the decision that my goals were Brier and Worlds and Olympics," Thiessen recalls. "And, as much as I loved [BL Teammates 2 and 3], I didn't think that they were going to get me there." So, he decided to approach NT Teammate 4, who was forming a new team for the next quadrennial, and ended up being included in a line-up that also featured NT Teammates 5 and 6. After a relatively slow start to their first

season together the team found its stride at the Alberta Men's Provincials advancing all the way to the final game before losing in heart-breaking fashion to the future 2010 Olympic Champions. "We dominated them that entire game, and then missed the two draws in the 10th and 11th ends," Thiessen recalls. "We really had the draw made in the 10th. NT Teammate 6 threw it perfectly. We over-swept it, because Teammate 4 was calling line, and we just didn't know how to handle it."

Although painful, that loss turned out to be pivotal to the team's future success, and to Thiessen's personal development. In many respects, that process began at a meeting called by their team coach, NT Coach 2, the week after their defeat. "We talked about the end of that game, how we were feeling as those shots were being played, how we reacted when we knew we had a draw to win," Thiessen remembers. "Just the whole process of how everything went down, and I think we learned a lot of how to better manage all that in the future." The team's results over the remainder of this period, which included Thiessen's first men's major title, the 2008 Canada Cup, would definitely support this comment. However, the ultimate validation came two seasons later when they added the 2010 Alberta, Canadian, and World Championships their growing list of accomplishments.

It should be noted, however, that these titles came on the heels of another major disappointment for Thiessen and his teammates, their failure to win the 2009 Olympic Trials. "At the Trials we were in every game, but we gave two games away," he says. "We could have easily have been 5-2, or even 6-1, and in the playoffs. We left there pretty choked, but had to play our Zones four days later." However, the team managed to overcome their disappointment, and began a run that would lead to Thiessen's first and only World Championship to date.

With this said, the culmination of Thiessen's journey may well have come in the final game of the Brier when the team was faced with a highly difficult draw to the button for the win. "I remember thinking back to 2007, as I was sweeping NT Teammate 6's rock down the ice in the 10th end of the Provincials, I was thinking 'I'm going to Brier, I'm going to Brier, I'm going to Brier,' not thinking about the weight, or the line, or anything," Thiessen explains. "So, I immediately stopped that thought process, because I'd worked with NT Coach 2. I said to myself, 'Okay, what time am I looking for? Clean the path, and focus on the process.'"

These comments are indicative of an athlete who was now able to apply the key lessons that he has learned under extreme pressure, and of one who had already achieved an elite level of athletic expertise. This reality is also borne out by Thiessen's personal performance level, which by this point can be considered to be nothing short of elite. This is evident from Table G.4, which compares his shooting accuracy to the established positional standards at the 2010 Brier. As indicated in this table, Thiessen ranked first among the 12 Leads in that field with an 89% shooting accuracy, which was an impressive five percent higher than the position average.

Table G.4

Nolan Thiessen's Shooting Accuracy at the Brier vs. Positional Standards: Period 2

Age	Season	Thiessen's Rank	Thiessen's %	Position Best	Position Average
29	2009-10	1	89%	89%	84%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

The fact that it took Thiessen until age-29 to win a men's international title can be partially explained by the fact that he did not win his first men's major title, the 2008

Canada Cup, until age-27, and that he only really began competing at the upper echelon the previous year. This slow climb to the top is evident from Table G.5, which details the hours that Thiessen invested in different forms of training and competition during this period. As indicated in this table, he invested 5,493 training hours and 2,418 competition hours, for a total of 7,911 overall curling-related hours in Period 2. This brought Thiessen's cumulative totals to 7,773 training hours, 3,468 competition hours, and 11,241 overall curling-related hours to this point in his career.

Table G.5

Nolan Thiessen's Curling-Related Training and Competition Hours: Period 2

Period 2		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
21-23	90	105	600	420	180	540
24-26	75	339	600	756	60	819
27-29	72	510	750	1,176	0	819
Period 2	237	954	1,950	2,352	240	2,178
Cumulative	687	1,039	3,555	2,492	750	2,718

Note. Thiessen invested 5,493 training hours and 2,418 competition hours, for a total of 7,911 curling-related hours during Period 2. At this point his cumulative totals sat at 7,773 training hours, 3,468 competition hours, and overall 11,241 curling-related hours.

Thiessen's journey to the top of the sport during this period was by no means a solitary one. Instead, it involved numerous teammates, and particularly those on teams skipped by NT Teammates 3 and 5. With this said, there is one teammate who seems to have made a particularly important contribution, his front-end partner on his championship team, and former Olympic silver medalist, BG Teammate 5. 'We didn't consciously do it, but it was just very easy to lean on him, because he'd played in everything,' Thiessen says. "In a lot of ways, [NT Teammate 5] was probably the most

influential player on our team, and on me.” At the same time, however, the group also benefited from a very strong collective team concept, which is evident from Thiessen’s account of their World Championship victory. “We wanted to win for each other so badly, as much as we wanted to win for ourselves,” he explains. “It was just like we were so proud to win it with each other, to stand on the podium, to sing the national anthem. That was just the best!”

Thiessen’s development was also strongly influenced by his coach with his championship team NT Coach 2, who is a sport psychologist. As previously mentioned, NT Coach 2 played an important role in helping the team to move on from their loss in the 2007 Alberta final, this was certainly not his only contribution. “[NT Coach 2] really opened our eyes as to how do we get the best out of each other, he says. “How can guys read the situation and change it for you so we don’t lose the game.” In explaining the details associated with this approach, Thiessen also highlights an important aspect of his evolving expertise. “There are times during a game when if you notice the difference in the communication, or in one of the guy’s actions, and you know that, ‘This isn’t a good thing for us,’ ” he explains. “Its all about how you get them out of that, get them re-engaged, and give our team the best chance to win.”

As it relates to his technical development, Thiessen’s comments indicate that the 273 technical training hours that he accumulated during this period were spent in a couple of different ways. “We came down here to the National Training Centre and threw lots with the video and stuff like that,” he says. “We tried to figure out our deliveries that way.” With this said, it appears that his Edmonton-based teammates (i.e., BG Teammates 5 and 6) also played an important role in this area of his development. “The three of us also threw a lot

at each other's brooms, getting guys' opinions on how you were throwing them," he explains. "[NT Teammate 5] really helped me improve that way. He was like, 'You're bringing it to this toe, or you're squaring it in that spot.' Just something like that."

Based on the teammate references contained in these comments, it is entirely possible that some of 954 tactical training hours that Thiessen accumulated in this period were actually focused on technical development. This is also supported by the fact that he makes no mention of these practices with respect to tactical development. Instead, he attributes this to the team's post-game de-briefs, which is something that NT Coach 2 insisted upon. "The other thing that [NT Coach 2] made us do was do a lot of was tactical de-briefs. He would make us de-brief, even though he didn't really understand some of the conversations," Thiessen says. "We got to the point where we realized we were getting better at that type of thing, and it was through just a ton of discussion within the team." According to Thiessen, these de-briefs typically revolved around shot selection and how these decisions might be influenced by opposition tendencies. "Sometimes, there's going to be two shots, and you've got to leave the guy one," he says. "So, leave him the one you think he might miss."

As it relates to his physical development, Thiessen credits his then girlfriend, and future wife, Kristine, with helping him to improve his eating habits and to shed some excess weight. "Being with her, meals were like chicken and vegetables, as opposed to pizza and stuff. It was a ton of water, as opposed to drinking a pop," he says. "That's also when I got a personal trainer, and started to have goals in the gym. That's when I did most of my transformation, because I was a pretty thick guy back then." Despite the health-related benefits associated with these changes, the primary motivation 1950 physical training

hours that Thiessen accumulated during this period was competitive in nature. “We got to the point where every player was working out, so you had to or you were falling behind,” he explains. “We knew that we had to do it, or we weren't going to win, so that made it easy to do.”

With respect to his mental development, Thiessen indicates that a large portion of the 2,352 mental training hours he accumulated during this period were focused on personal reflection. However, during his time with his championship team in particular, it is clear that NT Coach 2 also played an important role in strengthening the mental aspect of his game. “[NT Coach 2] worked a lot with us with how to perform under pressure. How to make sure that you play as well in the Brier final as you do in a regular bonspiel game,” he explains. It is important to recognize that in addition to the performance benefits associated with this training, NT Coach 2 also helped Thiessen to find some much needed perspective. “It's that type of work that he did a lot with us, and with me in particular. It was a lot of, ‘How do you not put too much into it?’ ”

Although Thiessen stepped completely away from baseball by the outset of this period, this does not mean that he was completely without other sporting involvement. Instead, he continued to play some golf, although his comments suggest that he clearly had mixed emotions about the sport. “I don't mind golf, but I can't do it too much because I'm not that good at it and it pisses me off,” Thiessen explains. “I was fine with going out there every three weeks or so, and if I had a couple of stinker holes I was okay with that. But, if I had golfed more often those mistakes would have really bugged me.”

Thiessen's involvement in golf is apparent from Table G.6, which summarizes the hours that he has spent in other sports during these middle years of his curling career. As

this table indicates, he invested 306 hours in other sports during Period 2, although it should be noted that this entire investment was related to golf. It should also be noted that these 306 hours brought Thiessen's cumulative total to 5,715 other sport hours to this point in his career.

Table G.6

Nolan Thiessen's Other Sports Training and Competition Hours: Period 2

Sports>	Provincial & National (Baseball)		Local (Hockey, Golf, Other)	
Ages	Training	Competition	Training	Competition
21-23	0	0	0	102
24-26	0	0	0	102
27-29	0	0	0	102
Period 2	0	0	0	306
Cumulative	1,695	1,293	1,050	1,677

Note. Thiessen invested 306 other sport hours during Period 2, for a cumulative total of 5,715 hours.

Period 3: After 2010 World Men's Championship to 2014-15 Season

The 2010 World Championship set the stage for by far the most productive period in Thiessen's career, and for an important change in his personal mindset. "For me, it was like it opened the door to, 'Hey, I need to be really professional about this, really take it serious, and really throw everything into it,'" he explains. "Because, I wanted to stay at the top." Interestingly, however, his teammate NT Teammate 6 had a very different reaction with the recognition that he had now achieved everything that he had set out to do in his curling career. Consequently, at the end of the 2010-11 season NT Teammate 6 retired from the sport, and was replaced at the Third position by NT Teammate 7, who had been an elite-level Skip for many years.

With NT Teammate 7 on board, the re-tooled team would have a very successful three-year run, finishing second in the 2012 Brier, and adding a Grand Slam title in each of the next two seasons. However, the culmination of their time together came when they won the 2014 Brier with a convincing final game victory over future NT Teammate 8's British Columbia foursome. But, any satisfaction that they may have felt was short-lived, as NT Teammate 4' informed the team the following week that he would be parting ways with them at the end of the season to join a new line-up for the next Olympic quadrennial. Not surprisingly, this had an impact on the team's psyche, and ultimately on their performance at the World Championships in China. "With [NT Teammate 4] telling us a couple of weeks before that he was leaving to start his new team, and then us hiding it from the media until we got over to Beijing, it was hard," Thiessen admits. "Also, China was just a hard place to curl, because the culture shock was astronomical for us. We just didn't handle it well."

In the wake of NT Teammate 4's departure, Thiessen, and NT Teammate 5 and 7 decided to stay together, and as such set out to find a new Skip. "We signed up [NT Teammate 8], and bet on his pedigree. He'd skipped before, and obviously had been very successful," Thiessen says. "[NT Teammate 7] didn't really want to do it, and we figured [NT Teammate 8] always wins." To complicate matters further, work commitments forced NT Teammate 5 to play a very limited fall schedule with the new line-up. "It was the strangest season ever," Thiessen says. "For the first half we were just awful by our standards, but after that we kind of turned the page." So much so, that they ended up winning the Brier again, and did so as the first-ever Team Canada to be included in the field.

However, their 2015 Brier victory was not without its complications, as NT Teammate 8 continued to struggle at the Skip's position. "[NT Teammate 8] made the call partway through the Brier to talk about changing the line-up," Thiessen explains. "We talked about it a lot, and when [NT Teammate 7] agreed to take over the team it really just, 'Okay, it's my team now, this is how we're doing things.' " From that point onward Team Canada was virtually unbeatable, advancing all the way to the final where they defeated 2014 Olympic gold medalist Brad Jacobs. Thiessen and his teammates then went on to represent Canada at the 2015 World Championships in Halifax, Nova Scotia, where they won a well-deserved bronze medal. "We didn't want to go to the Worlds and just fall our face after the story that we wrote at the Brier. But, we played really well all week in Halifax," he says. "We're all pretty proud, and it was a very positive experience for us. We definitely have a lot to build on now, on a go-forward basis, with [NT Teammate 7] at Skip."

Despite all the uncertainty that Thiessen endured over the past few seasons, his personal performances were remarkably consistent. This is evident from Table G.7, which compares his shooting accuracy to the established positional standards at the three Briers that he competed in during this period. As indicated in this table, Thiessen posted a shooting accuracy of 88% in 2012, 88% in 2014, and 91% in 2015. Although these performances ranked him third, fifth, and third respectively among the 12 Leads in each field, they were all very much on par with the 89% shooting accuracy that he posted at his first Brier in 2010 when he ranked first.

Table G.7

Nolan Thiessen's Shooting Accuracy at the Brier vs. Positional Standards: Period 3

Age	Season	Thiessen's Rank	Thiessen's %	Position Best	Position Average
31	2011-12	3	88%	90%	86%
33	2013-14	T5	88%	95%	88%
34	2014-15	3	91%	95%	89%

Note. This information was drawn from the Championships section of the Curling Canada website. Retrieved from <http://www.curling.ca/championships>.

These strong personal performances were built on the foundation of an extensive development program that Thiessen has followed over this five-year span. The scope of this program detailed in Table G.8, which shows the hours that he invested in different forms of training and competition during this period. As indicated in this table, Thiessen invested 4,395 training hours and 1,323 competition hours, for a combined total of 5,718 hour in Period 3. This brought his career totals to 12,168 training hours, 4,791 competition hours, and 16,959 overall curling-related hours as of the end of the 2014-15 season.

Table G.8

Nolan Thiessen's Curling-Related Training and Competition Hours: Period 3

Period 3		Training			Competition	
Ages	Technical	Tactical	Physical	Mental	League	Event
30-32	156	450	825	1,176	0	819
33-34	156	248	600	784	0	504
Period 3	312	698	1,425	1,960	0	1,323
Career	999	1,737	4,980	4,452	750	4,041

Note. Thiessen invested 4,395 training hours and 1,323 competition hours, for a total of 5,718 curling-related hours during Period 3. As of the end of the 2014-15 season, his career totals sat at 12,168 training hours, 4,791 competition hours, and 16,959 overall curling-related hours.

Unlike the previous period, when he practiced with his local teammates more often than not, a somewhat different reality existed in Period 3. "It got to the point where I just

said, 'I'm going to make practice times when I'm going to go. I'll email you at the start of the week, and you can join me for the ones you need to join me for' " he says. "So, from that point it's just kind of been, 'This is what I need, so I'm going to do it.' " It should also be noted that, as a result of a strong mutual respect among all team members, this approach was well received. "I think our team has always been really good and really professional in the way of not needing to be on top of each other, just saying, 'You need to be prepared.' " Thiessen notes. "Everyone needs to do what they need to do to prepare. So, if you need to practice five times a week, do it. If you need to practice three times a week, do it."

With Thiessen practicing more on his own, his comments confirm that the 312 technical training hours that he accumulated during this period have been spent somewhat differently than they might have been in the past. "I'm starting to get more structure in my practices now," he says. "Sometimes, I need to practice on my own to just work on Lead things." In detailing what he does in these practices, Thiessen makes it clear that his technical focus has now shifted to positional shot-making considerations. "Instead of throwing all 16 rocks down and all 16 rocks back, I'll throw 4 down and just throw all the Lead's rocks," he explains. "Really trying to concentrate on my position."

With NT Teammate 5 being Thiessen only local teammate since NT Teammate 6 left the team, there have been fewer practices that meet the operational definition of a tactical practice (i.e., more time spent in a non-throwing role than a throwing role) during this period. However, Thiessen still managed to accumulate 698 tactical training hours over this five-year span through a combination of weekend team training camps and curling observation. Once again, however, he does not mention any of these hours when commenting on his tactical development. Instead, Thiessen continued to emphasize

competition as the primary vehicle for this development, although it is interesting to note that this is now beginning to involve interactions with his new team coach. “After all those years of learning from NT Coach 2, it’s a good change for us to now have an experienced curling guy like NT Coach 3 with us as our coach,” he says. “It was a lot of like, ‘Food for thought,’ or ‘What do you think about this shot?’ He’ll probably take an even bigger role with us next year, with us playing more and having a few more goals.”

Thiessen has also made some important changes to how he has spent the 1,425 physical training hours that he has accumulated during this period. “I’ve got this place that I go to now that I really enjoy,” he says. “I’ve got a whole team behind me there. There are trainers, a chiropractor, massage, acupuncture; whatever I need.” According to Thiessen, this new training venue provides a true high performance environment. “It’s good for me in that is an environment where everyone in there’s really building towards a goal,” he says. “A lot of elite-level athletes, as opposed to going to the gym with the 65-year-old guys that just come to the gym a couple of times a week.”

In terms of his mental development, it appears that the 1,960 mental training hours that Thiessen accumulated in this period were spent much as they were on the previous period, under the direction of NT Coach 2. In fact, even though NT Coach 3 was no longer with the team, Thiessen believes he was still instrumental in their 2015 Brier victory. “[NT Coach 2] wasn’t our coach anymore, but I called him afterwards and told him that I used his teachings,” Thiessen says in recounting his preparation for the last shot of the Brier final. “One of the things that [NT Coach 2] taught us was just to ask a question, to see if you get the answer you want, to see if the guy’s locked in.” So, sensing that NT Teammate 7 was in an unfamiliar situation as the new Skip of the team, Thiessen asked him just such a

question. “I remember leaning over to [NT Teammate 7], and just saying, ‘Is this the same path as in 9?’ Of course, I knew it was the same path because the broom was on the edge eight like it was then,’ he says. “[NT Teammate 7] was like, ‘Yeah, same path as 9.’ And, I was like, ‘Okay, he’s locked in.’ He threw it, threw it perfect, and we put on the button.”

Beyond curling, Thiessen remained active in other sports and at the end of this period reconnected with baseball. This appears to have rekindled a sense of challenge that had been missing. “It has definitely been fun to play baseball again, and to be little bit competitive,” he says. “I used to tell people that, if I had the talent, I would leave curling in one second to go back to baseball. But, I just don’t have the talent. I know I can be at the top of the podium in curling, and I obviously can’t do that in baseball.”

With Thiessen’s return to baseball he has elected to spend even less time on the golf course, although it should be noted that he still maintains a limited involvement in that sport. This is confirmed by Table G.9, which summarizes his other sport involvement since he won the 2010 World Men’s Championship. As this table indicates, Thiessen invested 304 hours in other sports during Period 3, bringing his career total to 6,019 hours as of the end of the 2014-15 season.

Table G.9

Nolan Thiessen’s Other Sports Training and Competition Hours: Period 3

Sports>	Provincial & National (Baseball)		Local (Hockey, Golf, Other)	
	Training	Competition	Training	Competition
Ages				
30-32	0	0	0	102
33-34	12	136	0	54
Period 3	12	136	0	156
Career	1,707	1,429	1050	1,833

Note. Thiessen invested 304 other sport hours during Period 3, and a career total of 6,019 hours.

Career Trajectory by Competitive Milestone

The previous sections of this history have provided a detailed, period-by-period account of the many factors that have shaped the ongoing development of Thiessen's elite-level curling expertise. This final section will summarize his career trajectory in relation to five key competitive milestones (i.e., first pre-men's major title, first pre-men's international title, first men's major title, first men's international title, and last recorded men's major title). These milestones form the basis of Table G.10, which shows his age and years of experience in each case.

Table G.10

Nolan Thiessen's Age and Years of Experience by Competitive Milestone

Milestone	Event	Age	Years Curling
1 st Pre-Men's Major	2001 MB Provincial Juniors	20	8
1 st Pre-Men's International	2003 Winter Universiade	22	10
1 st Men's Major	2008 Canada Cup	27	15
1 st Men's International	2010 World Men's	29	17
Last Recorded Men's Major	2015 Brier	34	22

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

This table shows that Thiessen had been curling for 22 years as of the time of data collection (i.e., the end of the 2014-15 season), and confirms that he has been quite successful during these years. However, as has been demonstrated throughout this history, Thiessen's success has been the product of a substantial investment in curling training and competition over the course of his career. With this in mind, Table G.11 summarizes his

cumulative investments in these activities in relation to the five competitive milestones that have just been discussed.

Table G.11

Nolan Thiessen's Cumulative Curling Training and Competition Hours by Competitive Milestone

Milestone	Training	Competition	Overall
1 st Pre-Men's Major	2,280	1,050	3,330
1 st Pre-Men's International	3,090	1,530	4,620
1 st Men's Major	6,101	2,922	9,023
1 st Men's International	7,773	3,468	11,241
Last Recorded Men's Major	12,168	4,791	16,959

Note. Curling's Pre-Men's Majors include the Provincial Juniors, Canadian Juniors, World Juniors, Canada Games, University Nationals, and World Universiade. The Men's Majors include Provincial Men's, Brier, World Men's, Canadian Olympic Trials, Olympic Winter Games, Canada Cup, and the four Grand Slams (i.e., Players' Championship, Canadian Open, National, and Masters).

It is noteworthy that by the time he had won his last recorded men's major title, Thiessen had invested 12,168 hours in curling training, 4,791 hours in curling competition, and 16,959 hours in curling overall. It is also noteworthy that his hourly investments grew steadily as he achieved each of these milestones, which is indicative of a serious long-term commitment to the sport. For a more detailed breakdown of this commitment, please see Table G.12, which includes cumulative data on each type of curling training and competition in relation to all five competitive milestones.

At age-34 Thiessen believes that his curling career is far from over. In fact, as the winners of the last two Briers, he looked forward to the prospect of defending their title once again. "We have some goals of how to improve individually, and as a team," he says. "All with the expressed goal of competing in and winning the Brier." In fact, it was apparent at the time of data collection that Thiessen is squarely focused on the 2015-16

season, and was not allowing his thoughts to wander beyond that. "I'm at the point now too where I don't care about the legacy of it anymore. I don't need to win to say I've reached some point," Thiessen says. "I'd love to go and win the Olympics. But, I also know that the Trials are probably the biggest crapshoot in curling. There are so many good teams and everyone wants it so badly."

Table G.12

Nolan Thiessen's Cumulative Curling and Other Sport Hours by Competitive Milestone

Category>	Curling Training					Curling Competition			Curling	Other Sports	Combined
Milestone	Technical	Tactical	Physical	Mental	All	League	Event	All	All	All	All
1 st Pre-Men's Major	450	85	1,605	140	2,280	510	540	1,050	3,330	5,409	8,739
1 st Pre-Men's International	510	155	2,005	420	3,090	630	900	1,530	4,620	5,477	10,097
1 st Men's Major	639	699	3,055	1,708	6,101	750	1,899	2,922	9,023	5,613	14,636
1 st Men's International	687	1,039	3,555	2,492	7,773	750	2,718	3,468	11,241	5,715	16,956
Last Recorded Men's Major	999	1,737	4,980	4,452	12,168	750	4,041	4,791	16,959	6,019	22,678

Table G.13

Nolan Thiessen's Pre-Men's Men's Titles and Top-3 Finishes

Age	Season	World Juniors	Canadian Juniors	Provincial Juniors	Canada Games	University Nationals	World Universiade
20	2000-01	N/A	2	1	N/A	X	N/A
21	2001-02	N/A	N/A	N/A	N/A	N/A	N/A
22	2002-03	N/A	N/A	N/A	N/A	N/A	1
N/A	Titles	N/A	0	1	N/A	0	1
N/A	Top-3's	N/A	1	1	N/A	0	1

Table G.14

Nolan Thiessen's Men's Major Titles and Top-3 Finishes

Age	Season	Olympic Games	Olympic Trials	Men's Worlds	The Brier	Men's Provincials	Canada Cup	Players' Grand Slam	Can. Open Grand Slam	National Grand Slam	Masters Grand Slam
21	2001-02	DNP	DNP	DNP	DNP	DNP	N/A	DNP	DNP	DNP	DNP
22	2002-03	N/A	N/A	DNP	DNP	DNP	DNP	DNP	DNP	DNP	DNP
23	2003-04	N/A	N/A	DNP	DNP	DNP	DNP	DNP	DNP	DNP	DNP
24	2004-05	N/A	N/A	DNP	DNP	X	DNP	DNP	DNP	DNP	DNP
25	2005-06	DNP	DNP	DNP	DNP	2	X	X	X	DNP	DNP
26	2006-07	N/A	N/A	DNP	DNP	2	X	X	X	2	2
27	2007-08	N/A	N/A	DNP	DNP	3	1	T3	X	2	2
28	2008-09	N/A	N/A	DNP	DNP	X	X	X	X	X	2
29	2009-10	DNP	X	1	1	1	N/A	T3	X	T3	X
30	2010-11	N/A	N/A	DNP	DNP	2	3	T3	X	X	X
31	2011-12	N/A	N/A	DNP	2	1	X	X	T3	X	X
32	2012-13	N/A	N/A	DNP	DNP	2	X	X	X	T3	1
33	2013-14	DNP	X	X	1	1	N/A	X	1	X	X
34	2014-15	N/A	N/A	3	1	DNP	X	DNP	X	X	X
N/A	Titles	0	0	1	3	3	1	0	1	0	1
N/A	Top-3's	0	0	2	4	7	2	3	2	4	4