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## Exploring the Fall-Risk Experience of Masters Athletes Actively Competing in Sport

Dylan Brennan  
*The University of Western Ontario*

Supervisor  
Dr. Aleksandra Zecevic  
*The University of Western Ontario*

Graduate Program in Health and Rehabilitation Sciences  
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science  
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EXPLORING THE FALL-RISK EXPERIENCE OF MASTERS ATHLETES ACTIVELY  
COMPETING IN SPORT

(Thesis format: Monograph)

By

Dylan Brennan

Graduate Program in Health and Rehabilitation Sciences

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science

The School of Graduate and Postdoctoral Studies  
Western University  
London, Ontario, Canada

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## Abstract

The risk of falling increases in adults over the age of 65. Exercise can prevent falls. The motivation to partake in physical activity might be dependent on an older adult's experience with the risk of falling. Since the majority of older adults are sedentary, experiences of masters athletes can provide valuable insights. The purpose of this phenomenological study was to explore the fall-risk experience of masters athletes actively competing in sport. Masters athletes over the age of 55 (n=22) described their experiences in semi-structured interviews. Data was analyzed through an interpretive-constructive paradigm using inductive content analysis. There were five dominant themes that emerged (acceptance of fall risk, learning, heightened awareness, resilience, and self-fulfillment). Findings from this study indicate that competing in sport as an older adult can be self-fulfilling even when falls-risk is present. The findings can also inform health promotion campaigns targeting fall prevention in community dwelling older adults.

Keywords: Masters athlete, falls, risk, older adults, sport.

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## Operational Definitions

This page has been organized to assist the reader and may act as a reference to use as one reads through the thesis. For ease of use, it has been organized alphabetically.

**Active Aging:** The process of optimizing opportunities for health, participation, and security in order to enhance quality of life as people age (WHO, 2002).

**Baby Boomer:** Someone born between 1946 and 1965 (Statistics Canada 2011a).

**Exercise:** A subset of physical activity that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is an objective (Caspersen, Powell, & Christenson, 1985).

**Fall:** An unexpected event in which the participants come to rest on the ground, floor, or lower level (Lamb, Jorstad-Stein, Hauer, & Becker, 2005).

**Fourth Age:** Older adults typically over 85 years of age; often referred to as the “old-old.” This group is associated with negatives of aging, such as frailty, dysfunction, and co-morbidities (Gondo, 2012; Baltes & Smith, 2003).

**Hermeneutics:** The interpretation of experience via some ‘text’ or via some symbolic form (van Manen, 1990).

**Hermeneutic Circle:** Entails looking at the text as a whole, then reviewing and interpreting individual sections or parts, and relating back to the text as a whole in a repetitive, inductive coding process (Dowling, 2005).

**Inductive Analysis:** Content analysis method where one moves from the specific to the general, so that particular instances are observed and then combined into a larger whole (Elo & Kyngas, 2007).

**Interpretive-Constructive Paradigm:** Adheres to a relativist position that assumes multiple and equally valid realities; focuses on understanding the individual as a unique, complex entity (Ponterotto, 2005); At the foundation of interpretivism and constructivism is the belief that realities are different for each person depending on their

experiences, but elements of these realities can be shared between individuals and among larger groups (Guba & Lincoln, 1994).

**Lived Experience:** Individual experiences of people as conscious beings (van Manen, 1990).

**Masters Athlete:** Any individual who is over the age of 35 and actively trains to compete in athletic competitions at any level (recreational, competitive, or elite) into old age (Baker, Horton, & Weir, 2010).

**Member Check:** A strategy used to optimize the validity of qualitative research findings and ensure transcription accuracy whereby participants can check transcripts for accuracy and provide additional information, where necessary (Sandelowski, 2008).

**Osteoporosis:** The thinning of bones which causes them to become fragile and increase the risk of bone fractures (Sugerman, 2014).

**Paradigm:** A worldview that defines, for its holder, the nature of the ‘world,’ the individual’s place in it, and the range of possible relationships to that world and its parts (Guba & Lincoln, 1994).

**Phenomenology:** Describes the meaning for several individuals of their *lived experiences* of a concept or a phenomenon (Creswell, 2007).

**Physical Activity:** Any bodily movement produced by skeletal muscles that results in energy expenditure; physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities (Caspersen, Powell, & Christenson, 1985).

**Physical Fitness:** A set of attributes, namely, cardiovascular and muscular endurance, muscular strength, body composition, and flexibility that assist in performing physical activity (Caspersen, Powell, & Christenson, 1985).

**Resilience:** A global term that refers to a process by which people bounce back from adversity and reintegrate and ideally grow from the experience (Resnick, 2014).

**Retirement:** A major life transition that is associated with life changes after the stoppage of work (Barnett, van Sluijs, & Ogilvie, 2012).

**Risk:** A situation involving exposure to danger (Oxford Dictionary).

**Risk Perception:** An individual's perceived susceptibility to a threat (Ferrer & Klein, 2015).

**Sarcopenia:** A term often used to define the loss of muscle mass and strength that occurs with aging (Morley, Baumgartner, Roubenoff, Mayer, & Nair, 2001).

**Sedentary:** A lifestyle where someone has low energy expenditure pursuits (Colley et al., 2012).

**Selection, Optimization, Compensation (SOC) Meta-theory:** A model of life course development that describes a general process of adaptation; typically used to explain adaptations older adults make to minimize losses in biological, mental, and social reserves (Baltes & Baltes, 1990).

**Sport:** Involves both physical activity and exercise but has a specific set of rules and goals for individuals to train for and excel under (Zourikian, Jarock, & Mulder, 2010).

**Successful Aging:** Combination of three main components: low probability of disease/disease-related disability, high cognitive and physical functional capacity, and active engagement with life (Rowe & Kahn, 1997).

**Third Age:** Older adults typically aged 65-74 years; often referred to as the "young-old." This group is associated with positives of aging, such as increases in life expectancy and gains in mental and physical function (Gondo 2012; Baltes & Smith, 2003).

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# CHAPTER I

## INTRODUCTION

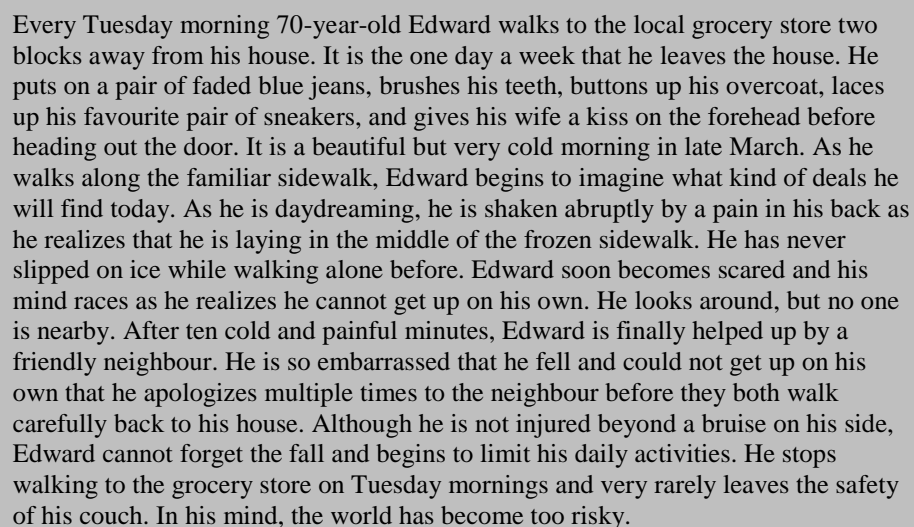
The Canadian population of older adults is expected to rise at an accelerated rate as the baby boom cohort ages (Statistics Canada, 2013; Barnett, van Sluijs, & Ogilvie, 2012). Results from the 2007 to 2009 Canadian Health Measures Survey (CHMS) indicated that 68% of adult men and 69% of adult women were sedentary while only 5% of adults were moderate-to-vigorously active (Colley et al., 2011). Falls occur throughout the life span, but especially among older adults where nearly one in every three community-dwelling adults over the age of 65 will fall at least once each year (Statistics Canada, 2013). By 2036, the number of Canadian older adults who will fall at least once each year is expected to reach 3.3 million. When a fall results in serious injury or disability, an older adult's independence is often compromised. This can lead to a decline in confidence and emotional well-being which can further decline health, strength, and function. In 2010, sport participation among Canadian adults aged 55 years and older was 17% (Canadian Heritage, 2013). Risk for falls and injury are always present in sport. Sport rules and regulations are put in place but risk management will never bring levels of risk to zero. Yet, there are older adults who continue to compete despite the risks. The purpose of this study was to answer the following question: What can we learn from the fall-risk experience of masters athletes actively competing in sport?

### **Falls of Older Adults in Canada**

With advancing age and sedentary lifestyles comes a number of challenges. One of these challenges is falling. As used by most researchers, a fall is defined by Lamb, Jorstad-Stein, Hauer, and Becker (2005) as “an unexpected event in which the participants come to rest on the ground, floor, or lower level” (p. 1619). Falls have significant implications for the well-being of older adults as they can have serious consequences including various levels of injury, disability, hospitalization, and even death (Public Health Agency of Canada, 2014). Should a fall happen, it could leave the person vulnerable to more injurious falls in the future which could then lead to long-term care admission.

The Canadian healthcare system should expect to see an increase in falls injury prevalence, of differing severity, accompany the baby boom cohort as they age. The Public

Health Agency of Canada's *Seniors' Falls in Canada: Second report* (2014) noted that falls were the cause of 256,011 injuries experienced by people over the age of 65 in Canada in 2009/2010. This number increased 43% from 2003. It was also noted in this report that there were 78,330 hospitalizations due to falls experienced by adults over the age of 65 in 2010/2011 and that 32% of these hospitalizations were of community-dwelling adults. After a fall, older adults are more likely to be placed in a nursing home or require medical attention to deal with injuries and disability (Doherty & Crossen-Sills, 2009). This has an impact on the Canadian healthcare system and equates to nearly \$2 billion a year in direct health care costs, including hospitalization, nursing home admissions, and surgeries (Public Health Agency of Canada, 2014). With this in mind, the maintenance of independence and good health of older adults is essential not only for the sustainability of the healthcare system, but also for the well-being of Canada's population of older adults. With the focus of Canadian demographics shifting to the large baby boom cohort, changes need to be made to improve functional capacity of older adults in order to reduce the impact of falls in later life. Figure 1.1 describes a fictional example of a typical sedentary individual's experience with falls based on information drawn from the literature review.



Every Tuesday morning 70-year-old Edward walks to the local grocery store two blocks away from his house. It is the one day a week that he leaves the house. He puts on a pair of faded blue jeans, brushes his teeth, buttons up his overcoat, laces up his favourite pair of sneakers, and gives his wife a kiss on the forehead before heading out the door. It is a beautiful but very cold morning in late March. As he walks along the familiar sidewalk, Edward begins to imagine what kind of deals he will find today. As he is daydreaming, he is shaken abruptly by a pain in his back as he realizes that he is laying in the middle of the frozen sidewalk. He has never slipped on ice while walking alone before. Edward soon becomes scared and his mind races as he realizes he cannot get up on his own. He looks around, but no one is nearby. After ten cold and painful minutes, Edward is finally helped up by a friendly neighbour. He is so embarrassed that he fell and could not get up on his own that he apologizes multiple times to the neighbour before they both walk carefully back to his house. Although he is not injured beyond a bruise on his side, Edward cannot forget the fall and begins to limit his daily activities. He stops walking to the grocery store on Tuesday mornings and very rarely leaves the safety of his couch. In his mind, the world has become too risky.

Figure 1.1: Edward's fictional story as an example drawn from the literature of a sedentary person's fall experience

## **Active Lifestyles**

Retirement “is a major life transition that is associated with life changes” (Barnett, et al., 2012, p. 329) which may involve new social circumstances, income, and shifts in time availability. These factors of retirement can positively or negatively affect physical activity behaviours. An inactive, or sedentary individual, has “low energy expenditure pursuits [less than or equal to 1.5 metabolic equivalents]” (Colley et al., 2012). Active Aging is a policy framework developed by The World Health Organization (WHO; 2002). It is defined as “the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age” (WHO, 2002, p.12). This framework advocates for an increase in physical activity and exercise into late life in order to keep populations healthier. The model of successful aging was proposed by Rowe and Kahn (1997). According to this model, to age successfully, a person must demonstrate a low likelihood of disease, high cognitive and physical functional ability, and be actively engaged in their life. Physical activity is described by the authors as being useful in modifying risk factors for disease and disability associated with all aspects of the successful aging model. A study by Baker, Meisner, Logan, Kuingl, and Weir (2009) determined the role of physical activity in supporting successful aging. Individuals who were physically active were 2.26 times more likely to age successfully than inactive individuals, independent of age, sex, and income. The current study focuses on sport in later life in response to the call for more research on physical activity in later life by the aforementioned Active Aging policy framework (WHO, 2002) and successful aging model (Rowe & Kahn, 1997).

Research over the past 40 years has begun to focus on a sub-population of older adults, called masters athletes, who are current recipients of physical activity’s health benefits. A masters athlete is defined as any individual who is over the age of 35 and actively trains to compete in athletic competitions at any level (e.g., recreational, competitive, or elite) into old age (Baker, Horton, & Weir, 2010). Masters athletes have gained popularity in research as they provide an intriguing perspective to the physical function aspect of successful aging (Baker et al., 2010). Although they are not immune to chronic diseases, researchers suggest that they are likely “better able to physically handle them” (Wright & Perricelli, 2008, p.447). Depending on the sport, their age can range from early 30s to over 100 years old. On a spectrum of physical activity levels, from not active to highly active, masters athletes lie opposite to sedentary older



adults. Figure 1.2 describes a fictional example of a masters athlete's experience of falls and sport.

*“Runners! Take your mark.”* Sheila can feel her palms begin to sweat as she kneels down and begins to step back into her blocks, preparing to challenge two other 70-something year old runners in a 100 meter sprint race. Her breathing begins to slow as she focuses on the finish line. She can barely make it out because she is not wearing her glasses, but she knows the track better than anything. She carefully brushes a bead of sweat off her forehead with her right hand before placing both hands behind the white starting line. *“Set!”* She straightens her legs and leans forward anticipating the gunshot. Sheila can feel her heart pounding through her chest as adrenaline courses through her body. The gun sounds and she is off! Sheila takes five short powerful strides before skidding her toe across the ground, knocking her off balance. As she tumbles, her heart sinks and tears well up in her eyes. This was her race to win. As a crowd begins to form around her, she gathers herself, brushes off her dusty shorts and shirt, and assesses the damage of the minor cuts and scrapes on her elbows and forearms. She is thankful she did not break her wrist again like the fall she experienced while training last winter. This was an unfortunate event, but for Sheila it will be used as a lesson to help lead her to the next race and the training to get her there.

Figure 1.2: Sheila's fictional story as an example drawn from the literature of an active person's fall experience

Every person is at risk for falls at some point in his or her late life. However, the impact a fall has on one's life can vary greatly between people. The fictional fall stories of two different older adults are meant to show an important contrast between two ends of the potential falls experience spectrum. Both fictional scenarios include an older adult experiencing a fall while partaking in an activity that was part of their normal routine, however, the influence the fall had on each faller is quite different.

### **Masters Sport**

Masters sport began with track and field around the mid-1960s. The first Masters US Track and Field Championship was held in 1968 and the first World Masters Championship was held in Canada in 1975 (Weir, Baker, & Horton, 2010). The World Masters Games (WMG) began in 1985 in Toronto, Ontario, with 8,305 people competing in 22 different summer sports

(Weir et al., 2010). Popularity of these games has grown substantially since then with the number of competitors in 2009 tripling the amount in 1985. The first winter WMG was hosted in Bled, Slovenia in 2010 and featured 3,000 competitors across 7 different winter sports. Since the birth of the term ‘masters’ in the 1960s, many other sports have adopted the term and provided opportunity for older adults to compete against other similar athletes. Sports dedicated to masters athletes typically use age-grading systems to group the competitors into five-year age categories (Medic, 2010), such as, 70-74 years old, 75-79 years old, etc. This helps account for performance decline as athletes get older and provides the athletes with better opportunity to compete with others of similar skill and performance. In this sense, the constant checking with age-grading scores and times keep masters athletes aware of functional and performance declines as they age. That being said, some older athletes choose to compete in recreational leagues or games where they play with younger people. An example of this is a community-organized hockey league where athletes may range from 18 to 80+ years old.

In Canada, sport participation among adults aged 55 years and older has declined from 25% to 17% from 1992 to 2010, respectively (Canadian Heritage, 2013). One possible explanation for this decline is the increased risk of injury in sports. Fuller (2007) explains that there is a high risk of injury in many sports so sport governing bodies and the people who compete in them are responsible for reducing the risks when possible. He also explains that “the risk experienced by each athlete is affected by his or her intrinsic risk factors and by the way in which these personal factors interact with the sports environment; each athlete, therefore, has a unique risk value” (p. 183). Therefore, with their own unique risks, masters athletes must develop their own risk assessment specific to their sport and assess what impact an injury due to a fall could have on their lives. For example, Brymer (2011) examined the lived experience of risk-taking in extreme sports and found that the 15 participants (30-72 years of age) “acknowledge that injury and death are possible and undertake to learn about the task, the environment, and their own capacity in order to curtail such unwanted events” (p. 233). It could then be possible that masters athletes may see falling as another part of the game that they prepare for or a fall may be seen as a learning tool to prevent further falls (Huang, 2004). As a further example, Olga Kotelko, who lived to the age of 95, was a track and field superstar who held more than 20 world records in different age categories. She knew she could throw further in the shot put event if she spun her body around to throw the weight with more momentum.

However, after seeing an older man fall by using this technique, she chose the simple shuffle throwing technique to avoid the greater risk of a fall and injury (Grierson, 2014). Perceptions and realities of a fall's impact may play a significant role in determining whether someone will deliberately participate in sport as a form of physical activity (Grant, 2001). With WHO calling for increased physical activity to keep people healthy as they age, exploration of the fall-risk experiences of masters athletes is important.

An underlying assumption of the current study is that masters athletes have a different attitude towards their experience with falls and the risk of falling when compared to older adults who are inactive. This assumption drives the research question: What can we learn from the fall-risk experience of masters athletes actively competing in sport? The exploration of falls risk experiences of masters athletes may help inform sedentary older adults about ways to manage risk, stay healthy, and live fulfilling independent lives.

## CHAPTER II

### LITERATURE REVIEW

In order to gain a better understanding of the current literature on falls, the purpose of this literature review was to explore and answer the question: What are the differences between sedentary and highly active lifestyles when researching falls and injury? This literature review consists of published papers and books gathered by searching Scopus, the Cochrane Library, PubMed, Google Scholar, and SPORTDiscus. Search terms included (masters athlete\* or older adult\* or senior\* or elder\*) and (community-dwelling\*) and (sport\* or physical activity\* or exercise) and (fall\* or injury\* and risk\*). Articles covered the 35 year date range between 1980-2015 in order to consolidate previous research and identify any missing gaps in the literature. Further articles were gathered from the reference sections of studies drawn from the original search strategy. Included research was critically appraised by the lead researcher by screening the article and book titles first, followed by abstract review if the titles applied to the purpose of the review. If the abstracts were deemed applicable to the current study, the full articles were reviewed. Research was excluded if the information was not relevant to the literature review question. Findings from the literature review were analyzed chronologically and sections of the review were identified after comparing and contrasting the included books and articles.

This literature review will begin by explaining the differences between physical activity, exercise, and sport. Barriers and motivations to partake in sport are then explained through the prism of Maslow's (1943) hierarchy of human needs. The review will then describe age-related physical changes. Two common age-related physical declines, specifically, sarcopenia and osteoporosis, will be used as examples of how these changes affect the human body and the importance of physical activity as people grow old.

Next, resilience and the Selection, Optimization, Compensation meta-theory (SOC) as proposed by Baltes (1997) are described with examples of how they fit with masters athletes. The SOC meta-theory is important for understanding how masters athletes continue to remain active into later life. With a better understanding of physical activity, the review shifts its focus to falls. Risk factors for falls are explained before the review outlines possible fall prevention strategies. Exercise and multiple component interventions are noted in multiple falls prevention

studies. Finally, this literature review will describe how sport is currently being used by masters athletes to improve physical function and describe the presence of both falls and injuries due to falls in sport.

### **Physical Activity, Exercise, and Sport Defined**

There are a few important distinctions that should be made between physical activity, exercise, and sport. Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (Caspersen, Powell, and Christenson, 1985, p. 126). Although physical activity can be categorized in many ways, Caspersen et al., (1985) divided it into three subcategories: 1) sleep, 2) at work, and 3) at leisure. Physical activity while sleeping is minimal. The leisure category can also be subdivided into multiple categories like sport and conditioning. Exercise is a form of physical activity “that is planned, structured, repetitive, and purposive in the sense that improvement or maintenance of one or more components of physical fitness is an objective” (Caspersen et al., 1985, p. 128). Physical fitness is composed of cardiovascular and muscular endurance, muscular strength, body composition, and flexibility. This means that when someone exercises, he or she is repetitively working on one or all of these components in a structured manner. Sport involves both physical activity and exercise but it is different in the sense that it has a specific set of rules and goals for individuals to train for and excel under (Zourikian, Jarock, & Mulder, 2010). Sports are typically grouped under the leisure activities subcategory of physical activity, with the exception being professional athletes who compete in sport for work. The current study focused primarily on sport.

### **Masters Athletes vs. Sedentary Older Adults**

On a spectrum of physical activity levels, from not active to highly active, masters athletes are placed on the highly active end with sedentary older adults at the opposite end. For sedentary older adults the most commonly reported barriers to physical activity were poor health, injury, and pain (Schutzer & Graves, 2004). An epidemiological study based in Germany asked participants over the age of 65 if they were subjectively active or inactive. Of the 1,937 participants, 286 said they were not sufficiently active. These non-active participants were then asked to respond to common physical activity barriers with either “agree,” “partly agree,” or “disagree” (Moschny, Platen, Klaaben-Mielke, Trampisch, & Hinrichs, 2011). The results

indicated that 57.7% (n=165) of the inactive participants agreed that poor health was the biggest barrier to physical activity. Other barriers included lack of company (43%; n=123), lack of interest (36.7%; n=105), lack of opportunity (23.1%; n=66), and fear of falling/injury (22%; n=63).

### **Motivations for Sport through the Prism of Maslow's Hierarchy of Human Needs**

Numerous studies have investigated the motivations of masters athletes for sport involvement. Their motivations and passion to compete in sport is interesting when one considers that they experience pain, injury, and the same chronic diseases that their sedentary counterparts face, such as osteoporosis (Nichols & Rauh, 2011). Motivations to be involved in masters sport are very personalized and age-specific, but common motives include participating for health benefits (Allender, Cowburn, & Foster, 2006; Ogles & Masters, 2000), enjoyment (Allender et al., 2006; Dionigi, 2006), life meaning (Ogles & Masters, 2000), gaining social support and the camaraderie of being with a team or competitors (Allender et al., 2006; Dionigi, Baker, & Horton, 2011; Grant, 2001; Grant, 2008; Ogles & Masters, 2000; Schutzer & Graves, 2004), serious play (Grant, 2001), and the opportunity to embrace new challenges (Dionigi et al., 2011; Grant, 2008). Masters athletes have to overcome many barriers to become and remain active in later life. The exploration of their experiences may help inform inactive sedentary older adults how to overcome their own barriers.

Maslow's (1943) hierarchy of human needs is a well-documented theory that explains human motivation. Maslow contends that people are motivated by five hierarchically organized human needs: physiological needs, safety needs, love/belonging needs, esteem needs, and self-actualization needs. When one need is satisfied, peoples' motivation is modified to satisfy the next need. He explained that "a want that is satisfied is no longer a want" and that we are "organized only by unsatisfied needs" (p. 375). This hierarchical progression can help to elucidate the motivations and drives in people of any age.

The hierarchy begins with the most basic human needs, which are physiological. This includes the need for both food and water. This need is situated as the most basic because satisfying one's hunger is essential to all other bodily functions and capacities. When people are extremely hungry, their only thoughts are on finding food and they cannot focus on anything

else. If the physiological needs are well satisfied, the next need becomes apparent. Maslow refers to the second human need, safety, “as an active and dominant mobilizer of the organism’s resources only in emergencies” (p.379). Examples of such an emergency include natural disasters, extreme weather conditions, rabid animal attacks, or injury. For the most part in modern society, adults’ safety needs are well met. The third human need on the hierarchy is the love and belonging need. When physiological and safety needs are satisfied, a person will long for meaningful relationships. This is likely satisfied through a few different avenues, such as friendships, affectionate relationships, or being part of a family or team. The fourth human need is the esteem need. This is the desire for a high self-esteem, self-respect, and positive image of self. Maslow (1943) explains that when this need is met, it “leads to feelings of self-confidence, worth, strength, capability, and adequacy of being useful and necessary in the world” (p. 382).

The final need of the hierarchy is self-actualization. Maslow explains that this “refers to the desire for self-fulfillment, namely, to the tendency for [one] to . . . become everything one is capable of becoming” (p.382). If all of the other four needs are satisfied, a person who has not reached their potential will soon feel uneasy or restless. Maslow (1943) further explains that most people do not reach self-actualization, but continuously strive towards it as a means of finding one’s true self or purpose in life. This theory is important to the current study since it helps explain why masters athletes are motivated to compete in sport into late life.

### **Age-Related Changes**

There are many changes related to aging. This literature review focuses only on muscle function and bone health because both relate to falls and injury. They also decline as a result of sedentary lifestyles and can be reversed through exercise. Finally, both are commonly studied by comparing masters athletes to inactive older adults which makes them applicable to the current study.

### **Muscle Function**

As humans reach old age their bodies change and physical abilities may begin to decline, referred to as age-related changes or functional decline (Marks, 2006). Sarcopenia is a term that is often used to “define the loss of muscle mass and strength that occurs with aging” (Morley, Baumgartner, Roubenoff, Mayer, & Nair, 2001, p. 231). Total muscle mass decreases as a

sedentary individual ages which appears to be due to a decrease in muscle fibres (Maharam, Bauman, Kalman, Skolnik, & Perle, 1999; Wright & Perricelli, 2008). The loss and the shrinking of the remaining fibres has been suggested by Maharam et al. (1999) to be due to sedentary lifestyles. Similarly, Saxon, Etten, and Perkins (2015) noted that a decline in muscle strength is associated with the changes in lean muscle mass due to inactivity. This inactivity leads to a decline in muscle efficiency and power which may make day-to-day activities difficult to perform. Muscle power has also been closely linked to functional status (Morley et al., 2001). Also, with sarcopenia a 15% decline in metabolic rate, or energy usage by the body, often accompanies the loss of lean muscle mass and a sedentary individual may experience a gain in body fat of 10-20% by age 80 (Marks, 2006). The loss of muscle and increase in body fat can result in poor physical shape and expose the individual to further health issues. However, not all declines are inevitable and many related to muscle function can actually be mitigated and reversed with exercise. Resistance training of older adults has been shown to increase the amount of muscle fibres in the muscles being trained and enlarge the fibres to a size similar to that of 20-year-olds (Maharam et al., 1999). Continued moderate to high intensity strength training can offset this decline and help an individual maintain or even improve their muscle strength. This makes exercise the most effective treatment for sarcopenia.

Balance is affected by muscular changes and muscle power. Poor postural control, changes in the neuromuscular systems, and changes in proprioception of the foot and leg muscles affect balance. An older adult is less likely to sense changes in postural sway, which could cause instability (Lamoth & van Heuvelen, 2012). Any external challenge of balance for an older adult, such as a trip or slip, will be difficult to recover since proprioceptors are less able to sense change and muscles are unable to generate force quick enough to make postural adjustments (Concannon, Grierson, & Harrast, 2012). Similar to the gains in muscle function through resistance training, balance can be learned through the combination of balance-specific exercises and strength training (Concannon et al., 2012). The addition of high velocity power training is also beneficial, specifically for falls prevention, since older adults will need to generate muscle force quickly to recover from loss of balance.

Another change in the aging body is a decrease in collagen. Collagen plays many roles in maintaining healthy bones and muscles. Its decline translates to stiffer tendons and connective



tissue (Maharam et al., 1999; Pyron, 2002). With stiffer tendons and connective tissue, the body's joints become less flexible which can affect coordination and motion fluidity (Wright & Perricelli, 2008). The declines in muscle strength and the increased stiffness of joints and tissues can have serious implications on activities of daily living. For example, an 80-year-old woman might not be able to carry a bag of groceries into her home and her weakness may leave her vulnerable to a fall and injury (Dutta & Hadley, 1995). With this in mind, an active lifestyle is likely the key to maintaining proper muscular function.

### **Bone Health**

A number of age-related changes also occur in bones. Osteoporosis is one of these changes and is defined as the thinning of bones which causes them to become fragile and increase the risk of bone fractures (Sugerman, 2014). The effects of osteoporosis can be seen through a DEXA bone scan which is a low-risk test for determining the person's bone density (Sugerman, 2014). If a test like this is not completed, most people will be unaware that they have osteoporosis. Bone mass typically declines slowly at a rate of 0.4% per year after its average peak at around age 50 for men. This decline is more dramatic in women who could see a drop between 0.75% and 1% per year after the age of 30 (Maharam et al., 1999). After menopause, this rate may triple and cause many women to lose almost a third of their bone mineral density by the time they reach 80 years of age (Maharam et al., 1999). For this reason, osteoporosis is very common among post-menopausal women, who experience a drop in the estrogen hormone which plays a role in maintaining healthy bones (Maharam et al., 1999). Vitamin D and calcium are two essential vitamins and minerals associated with bone health and a deficiency in either could contribute to a decline in bone health (Sugerman, 2014). As with muscle function, continued resistance training and weight-bearing exercises throughout the lifespan can greatly improve bone health and bone density (Concannon et al., 2012). These exercises strengthen the bones which helps reduce the risk of fractures. The understanding of osteoporosis, sarcopenia, and exercise will become more important as the number of older adults continues to grow in the next 20 years.

### **Resilience**

In order to deal with and adjust to age-related functional changes, resiliency becomes an important factor. There has been much debate in the literature about what resiliency is and there is currently no consensus on its definition. Wu et al. (2013) defined resilience as “the capacity

and dynamic process of adaptively overcoming stress and adversity while maintaining normal psychological and physical functioning” (p. 1). Herrman et al. (2011) said that “resilience refers to positive adaptation, or the ability to maintain or regain mental health, despite experiencing adversity” (p. 259). Resnick (2014) defined resilience “as a global term that refers to a process by which people bounce back from adversity and reintegrate and ideally grow from the experience” (p. 155). For the purposes of the current study, Resnick’s (2014) definition of resilience will be used.

Hu, Zhang, and Wang (2015) conducted a meta-analysis on 60 studies to examine how trait resilience affected mental health, whereby resilience was seen as a personality trait. They found that there was a “negative correlation between trait resilience and negative indicators of mental health, and a positive correlation between trait resilience and positive indicators of mental health” (p. 20). The authors also found a gender difference in trait resilience: “as percentage of male participants increased, a weaker effect was observed” (p. 22). This revealed that more attention needs to be given to the relationship between trait resilience and mental health in women. The meta-analysis by Hu et al. (2015) revealed that age was a factor in the relationship between trait resilience and negative mental health indicators, but not positive indicators. Adults at any age over 19 had stronger trait resilience than youth. Lastly, the authors found that adversity strengthened the link between trait resilience and mental health and suggested that “trait resilience may comprise both innate and acquired contents, both relatively stable and influenced by environmental factors” (p.25). Therefore, they feel that increasing opportunities to face adversity may help strengthen trait resilience.

Different from trait resilience, Resnick (2014) explained that resiliency can be seen as a “dynamic process that facilitates individuals’ ability to overcome the challenges at different points throughout the life course” (p. 155). It is through resilience that many people can see a chance to grow and learn. Youth has been identified as a significant life stage that impacts one’s resiliency in later life. Herrman et al. (2011) explained that “harsh early environments can affect developing brain structure, function, and neurobiological systems” and that these changes “can affect the capacity to moderate negative emotions, and thereby affect resilience to adversities” (p. 260). Negative youth environments and poor child rearing can leave the child vulnerable to depression and various other health conditions when they grow up. Collins and MacNamara

(2012) argued for the implementation of challenging and “structured trauma” (p. 908) in the talent development system of youth sport. They made this argument as a means of developing high performance athletes. However, they also outline that in fostering this environment, it could arguably help the young athletes develop resilience for later life to keep them from giving up in different life circumstances.

The actual mechanism of how resilience is acquired is still mostly unknown. Wu et al. (2013) outlined multiple genetic factors that affect how people respond to stress and trauma in life. Other researchers put emphasis on resilience as a personality trait (Hu et al., 2015). While it was originally thought to be a static, unchanging trait, there seems to be some agreement that aspects of resiliency, even trait resiliency, can be learned or acquired throughout life in a dynamic process (Resnick, 2014; Wu et al., 2013; Herrman et al., 2011; Collins & MacNamara, 2012; and Hu et al., 2014).

### **Selection, Optimization, and Compensation**

After reviewing the literature on masters athletes and age-related changes of the body, another theory became particularly applicable when considering older adult initiation or continuation of sport involvement. The Selection, Optimization, Compensation meta-theory of development described by Paul Baltes and Jacqui Smith (2003), is based on the assumption that “the life course consists of a changing script regarding the means and goals of life” (p. 132). Baltes (1997) explained in an earlier paper that life span development is based on a series of gains and losses in functioning. As an individual grows as a child or youth, their gains often greatly exceed their losses as they grow, learn new skills, and gain knowledge of how to function as a human. As the person reaches old age, the gains begin to slow and the balance shifts in favour of losses. Evidence of this shift can be seen in the transition from the third to the fourth age.

An example of the Selection, Optimization, Compensation meta-theory provided by Baltes in 1997 is an older adult professional pianist. Cognitive and physical decline is associated with the normal aging process (Baltes & Smith, 2003) which means that processing time decreases and an older pianist will not be able to play songs the same way he could when he was younger. In order to make up for this loss, the pianist will select specific songs to play and only practice those songs, rather than learn new ones, thereby optimizing his performance of selected

songs. Normally, a pianist in his prime would play the notes as he read them on the music sheet. An older adult pianist will, however, compensate for his loss in processing time and piano key tapping speed by looking further ahead on the music sheet. The pianist will then vary his playing speed slightly in a manner that does not change the music's fluidity to the listener. The pianist may also practice these selected songs more frequently than a younger person would. In this sense, the older adult pianist is also *selecting* to focus his time on piano practice rather than other activities.

Similar principles from this pianist example can be applied to a masters athlete with sport skills replacing the piano playing skills. For example, a masters runner may select a 5 kilometer run if she has good endurance. To minimize her losses in function, the masters runner will only practice and compete in this event. She will compensate for physical changes, such as the shortening of connective tissue and muscle or joint inflexibility, by taking shorter and quicker running strides (Wright & Perricelli, 2008). In this sense, masters athletes are subconsciously maintaining a balance between their functional gains and losses.

### **Risk Factors for Falls**

Risk factors and reasons for falls have been widely studied to date. Ambrose, Paul, and Hausdorff (2013) performed a systematic review of RCTs, meta-analyses, and clinical trials to identify fall risk factors in older adults. They found that falling in the past year was associated with the chance of falling again (likelihood ratio range of 2.3-2.8). Gender differences have also been shown to be risk factors for falls. Doherty and Crossen-Sills (2009) noted that after adjusting for age, "women are 67% more likely than men to have a nonfatal fall injury" (p. 48) but men had a 49% higher fatal fall rate in the United States in 2004. Ambrose et al. (2013) also noted that women were 58% more likely than men to have a non-fatal fall, but the death rate from falls was 46% higher in men than women, when age was accounted for. A possible explanation for this discrepancy is that men typically take more risks in daily activities than women. Gait irregularities and imbalance were two prominent risk factors for falls, as well as short stride length. The authors also noted that the more risk factors a person had, the more likely they were to fall.

Kwan and Straus (2014) performed a systematic review of “high-quality systematic reviews [judged via the AMSTAR tool] pertaining to assessment of patients who have fallen and management of their subsequent care” (p. E610). They noted that in one of the reviews, a fall within the past year was associated with further falls (LR range 2.3-3.8). They also noted a meta-analysis of prospective studies that showed an odds ratio of 1.98 (95% CI 1.60-2.46) for balance impairment leading to fall risk. Kwan and Straus (2014) also noted that fall risk increased with age and a person’s medical history was important in determining their risk for falls.

The majority of studies have shown that environmental hazards, such as slippery surfaces and objects on the ground, are the leading causes of falls in older adults (Braun, 1998; Doherty & Crossen-Sills, 2009; Rubenstein, 2006; Tinetti & Speechley, 1989; Tinetti, Speechley, & Ginter, 1988). A number of specific hazards, such as objects on the floor, stairs, snow or ice, poor lighting, smooth or slippery floor surfaces, inappropriately placed furniture, and housing characteristics were all identified (Braun, 1998; Doherty & Crossen-Sills, 2009; Tinetti & Speechley, 1989; Tinetti et al., 1988; Rubenstein, 2006). In addition, Tinetti and Speechley (1989) suggest three points that relate to the environmental risk factors. Specifically, a minor hazard to the average person may be a very serious hazard to a frailer individual. Second, as Rubenstein (2006) also notes, the interaction between the environmental hazard and the individual’s specific disabilities or susceptibilities, such as low step height, are what puts the person at an increased risk of falls- not necessarily the hazard itself (Tinetti & Speechley, 1989). Lastly, an environmental risk factor can be modified if the individual has experience with the hazard (Tinetti & Speechley, 1989). For example, an older adult who frequently uses stairs would be less likely to fall on stairs than an older adult who rarely uses the stairs. In a study done by Braun (1998), participants were asked about their perceptions of falling. Although they understood the risks and consequences of falling to older adults, they downplayed their own susceptibilities.

Another major risk factor for falls is the use of multiple (typically four or more) medications (Braun, 1998; Doherty & Crossen-Sills, 2009; Concannon et al., 2012; Rubenstein, 2006). The following medications were cited as being linked, either directly or indirectly, to falls risk: diuretics, antihypertensive agents, and sedatives (specifically, benzodiazepines, phenothiazines, and anti-depressants). Medications were related to falls independent of the

disease or condition they were used to treat (Tinetti & Speechley, 1989; and Tinetti et al., 1988). The more medications an individual is taking, the greater their risk of falling.

Additional risk factors can be grouped as intrinsic to the individual. Among the highest predictors of falls are old age and an individual's history of falls. People who fall on a regular basis (i.e., monthly) are more likely to fall than non-fallers (Doherty & Crossen-Sills, 2009). Musculoskeletal problems, specifically muscle weakness in the lower extremities, may be responsible for many falls as weakness may negatively affect an individual's gait (Doherty & Crossen-Sills, 2009; Braun, 1998; Tinetti & Speechley, 1989; Tinetti et al., 1988). With weak muscles, gait becomes more unstable leaving an individual vulnerable to slips and trips. The more problems or disabilities an individual has with their lower extremities, the greater the risk of falls. Tinetti and Speechley (1989) found that the majority of falls occur when an older adult is doing a usual activity like walking or when they shift their centre of gravity suddenly. With activities like these being done on a daily basis, they become quite important risk factors. Other intrinsic risk factors for falls include vision problems (i.e., cataracts), hearing, cognitive impairments, dizziness, frailty, comorbidities, chronic or acute illness, proprioception changes, foot problems, bone and joint dysfunction, loss of balance and poor postural control, and vestibular dysfunction (Braun, 1998; Doherty & Crossen-Sills, 2009; Tinetti & Speechley, 1989; Tinetti et al., 1988; Rubenstein, 2006; and Lamoth & van Heuvelen, 2012).

The fear of falling is a psychological response that often accompanies falls and may put an individual at risk of falling (Tinetti, Richman, & Powell, 1990). Research on this topic described changes in behaviour whereby people reduce activities because they are afraid that their actions will result in a traumatic fall with negative outcomes, such as becoming dependent on others (Tinetti et al., 1990; Rubenstein, 2006; Lee, Mackenzie, & James, 2008; and Ward-Griffin et al., 2004). For example, in a study on fall-related risk factors of 120 older adults aged 62-99 living in a Minnesota community, Braun (1998) found that there was a 22.3% reduction (n=26) in activity participation due to the fear of falling. The reduction of activities can then lead to physical and functional declines which could lead to muscle weakness. This could then put the person at further risk of falls in any activity (Rubenstein, 2006). Rubenstein (2006) refers to this negative cycle as the "post-fall anxiety syndrome" (p.ii38). Researchers have also cited the link of the falling experience to self-efficacy. When a faller has a low perceived self-efficacy, they

are more likely to avoid risk and activities that they perceive as risky (Ward-Griffin et al., 2004). People with higher levels of perceived self-efficacy are more likely to participate in activities that put them at risk, which may actually be protective against physical and functional declines (Ward-Griffin et al., 2004). High self-efficacy after a fall may be protective against further falls, which brings up the question of whether the fear of falling itself can have a positive impact on someone's life. A fall can be seen as a learning experience, or as Huang (2004) suggests, as a first step to learn coping skills in fall prevention. This positive outlook of falls and fear of falling is one that has not been cited much in the literature, where the focus has been primarily on the negative impacts of falls on the human body and mind. A key message with fall risk factors seemed to be that everyone is different and no matter how many risk factors are identified through research, there are likely to be many more that are person-specific.

### **Prevention of Falls**

Even with a keen awareness of fall risk factors, strategies to minimize falls are highly individualized. A recent systematic review included 159 randomized controlled trials examining different interventions for reduction in falls of community-dwelling older adults (Robertson & Gillespie, 2013). After data was pooled, 16 trials testing group exercise programs and seven trials testing home-based exercise programs were recommended as interventions to reduce the incidence of falls. Rate ratios were 0.71 [95% CI 0.63-0.82] and 0.68 [95% CI 0.58-0.80] respectively (Robertson & Gillespie, 2013). These programs were multifaceted, with a specific emphasis on balance and muscle strengthening.

In another systematic review and meta-analysis, Goodwin et al., (2014) examined the pooled effect of 17 RCTs examining multiple component interventions compared to no intervention, placebo, or usual practice control groups. In multiple component interventions "participants receive a fixed combination of two or more interventions e.g. exercise and Vitamin D" (Goodwin et al., 2014, p.2). The results of the pooled risk ratio revealed that multiple component interventions reduced the number of people who fell by 15% (pooled risk ratio=0.85 [95% CI 0.80-0.91]) and reduced the fall rate by 20% (pooled rate ratio=0.80 [95% CI 0.72-0.89]) when compared to the control groups (Goodwin et al., 2014). The authors noted that a total of 12 of the 17 studies included exercise as part of the intervention.

In another systematic review and meta-analysis of randomized controlled trials for fall prevention interventions, Chang et al. (2004) found a statistically significant positive effect of exercise on reducing the risk of falls after pooling the data (RR 0.86, 95% CI 0.75-0.99) (p. 4). In a randomized controlled trial by Barnett, Smith, Lord, Williams, and Baumann (2003), participants were assigned to an exercise and education intervention group (n=83) or an education-only control group (n=80). The exercise intervention had three components: 1) a weekly one hour group exercise class that was delivered in the community by an accredited instructor for 37 weeks, 2) a home exercise plan, and 3) education on how to avoid falls (Barnett et al., 2003). A number of physical performance measures important to falls, such as postural sway, knee extension strength, leaning balance, sit to stand, and walking speed, were assessed at baseline and at 26 weeks into the trial, as well as general health status, and self-reported falls. After the one-year trial period ended, the falling rate was significantly reduced by 40% in the exercise group compared to control (Barnett et al., 2003). A particularly positive result from this study was that significant improvements were seen in intervention participants for three balance tests at the 6-month follow-up. These findings suggest that exercise with a balance component can improve balance performance, a major risk factor for falls (Barnett et al., 2003).

Tinetti and Speechley (1989) outlined a multiple step strategy in the prevention of falls for older adults. Their first step was a comprehensive assessment of an individual for risk factors and predisposing dysfunction, even if the person appeared healthy (Tinetti & Speechley, 1989). Some risks may be modifiable, such as inactivity and muscle weakness, so the next step was to observe normal movements of the individual through balance tests such as the “get up and go test” (Tinetti & Speechley, 1989, p.1057). Lastly they suggested assessing the individual’s living environment and making a final assessment of any previous falls to prevent recurrences.

Researchers seem to agree that a comprehensive assessment of an individual is a necessary primary step for fall prevention (Rubenstein, 2006; Tinetti, 2003; Tinetti & Speechley, 1989; Doherty & Crossen-Sills, 2009; Chang et al., 2004; Barnett et al., 2012). In a randomized controlled trial by Close et al. (1999), 397 community-dwelling patients over the age of 65 who presented to an emergency department following a fall were randomized into either usual care (n=213) or a comprehensive assessment only (n=184). After a one-year follow-up, falls risk was reduced significantly by 61% (OR 0.39, 95% CI 0.23-0.66) and recurrent falls risk was reduced



by 67% (OR 0.33, 95% CI 0.16-0.66) in the intervention group compared to control (Close et al., 1999). Rubenstein (2006) noted that assessment of a patient with a history of falls is crucial, with a particular focus on the circumstances and symptoms at the time of the fall.

Lastly, in a randomized controlled trial of community-dwelling women over the age of 80, Campbell, Robertson, Gardner, Norton, and Buchner (1999) randomly assigned participants to either a usual care control group (n=117) or a home-based exercise program focused on muscle strengthening and balance retraining, with a walking component (n=116). After a two-year follow-up, 74% of the control group and 69% of the intervention group remained in the trial (Campbell et al., 1999). For the participants remaining, the results showed a 31% reduction in falls (HR 0.69, 95% CI 0.49-0.97) and a 37% reduction in injurious falls (HR 0.63, 95% CI 0.41-0.90) in the exercise group compared to control (Campbell et al., 1999). It is worth noting that the first year of intervention for the exercise group was supervised periodically by a physiotherapist and in the second year, telephone contact was used to keep participants motivated to exercise. The results described above indicate that falls can be prevented and that comprehensive assessments and exercise programs, that combine balance and muscle strengthening, may be the most efficient methods to prevent falls.

### **Falls and Injury in Sport**

As research shows, exercise regimes are capable of preventing falls. With this in mind, a question arises: can sport be an effective strategy in the prevention of falls and injury from falls? At this point, no study that explores this could be identified in the literature. Before exploring this question, it is important to briefly explain the occurrence of injury in older adult sport. Maharam et al. (1999) noted that common masters athlete injuries were: fractures, rotator cuff tears, Achilles tendon ruptures, and knee cartilage tears. These types of injuries could potentially be explained by the loss of collagen with aging. A European epidemiological study used data records from a trauma center to track patients over the age of 65 who sustained an acute injury while doing sports (n=2,635) in Tyrol, Austria. Kammerlander et al. (2011) found that the total number of sport injuries tripled from 178 in 1996 to 393 in 2006. The most common injuries were minor cuts and scrapes (40.4%) followed by fractures (27.4%). The most common fracture sites were fractures to the skull (16.4%), shoulder or upper arm (10.7%), rib or thoracic spine (9.3%), and forearm or wrist (9.2%). The authors also noted that when older adults were injured,

their recovery and healing period were often prolonged. Another result from Kammerlander et al. (2011) was that the most common mechanism of injury was a fall (69%) and the three most injurious sports were alpine skiing (40.1%), cycling (24.8%), and mountain climbing (15.8%). The authors concluded that the increase in older adult injury from 1996-2006 was likely due to the rising proportion of adults over the age of 65 who were active into later life. They also concluded that identifying types of injuries, how the injuries occurred, and how frequently they occurred was a step forward in the development of injury preventative measures.

Results of the Canadian Community Health Survey in 2009-2010, showed that 37,000 adults over the age of 65 sustained activity-limiting serious injuries while competing in sport (Statistics Canada, 2011b). When the walking and leisure or hobby categories were added to this statistic, this number increased to 184,000 older adults sustaining activity-limiting serious injuries (Statistics Canada, 2011b). These statistics only considered serious injury. Montelpare (2010) noted that “there is no consistent injury-reporting system across the various Masters Athlete sports” (p. 180) so many more injuries sustained during sport likely go unreported. With falls being the most common mechanism of injury identified by Kammerlander et al. (2011), and the high incidence of serious injuries in sport for older adults in Canada, the current literature review will now shift to the benefits of masters athlete training.

Marks (2006) performed a study comparing the health benefits of tennis for youth and senior tennis players. The author noted that tennis can improve leg strength which is associated with better balance and stronger gait mechanics. This “can enable older individuals to avert a fall” (Marks, 2006, p. 474). Marks (2006) also noted that improved bone density gained through the weight-bearing physical activity of tennis can reduce the risk of fractures if a fall does occur. Nichols and Rauh (2011) noted the need for weight-bearing exercise in reducing the risk of fractures for master cyclists who may be highly active yet lack the specific weight-bearing needed to strengthen their bones. A study by Wroblewski, Amati, Smiley, Goodpaster, and Wright (2011) examined 40 masters athletes, aged 40 to 81 who trained 4-5 times per week, and found that chronic exercise “preserved muscle mass and prevented fat infiltration of muscle” (p. 176). Participants retained muscle strength and although it decreased around age 60, the effect leveled off and the masters athletes were able to maintain significantly higher muscle strength than sedentary older adults (Wroblewski et al., 2011).

In terms of balance and sport, Lamothe and van Heuvelen (2012) found that the postural control of older adult ice-skaters was similar to that of younger ice-skaters. Their results suggested that the improvement in postural control of ice-skating older adults was likely due to a “better use of somatosensory inputs through practice” (Lamothe & van Heuvelen, 2012, p. 492). These older athletes were also less likely than non-skating older adults to need vision cues to maintain balance (Lamothe & van Heuvelen, 2012). Brauer, Neros, and Woollacott (2008) compared balance responses of masters athletes to healthy older adults and found similar results. In this study by Brauer et al., (2008), a perturbation platform was used and participants were asked to move their feet as little as possible when the platform was moved in different directions. At fast perturbation speeds (50 cm/s), the masters athletes were able to keep their feet in place 46% of the time versus the healthy older adults who kept their feet in place only 18% of the time (Brauer et al., 2008). The masters athletes also regained their balance quicker than healthy older adults and used more efficient means of balance recovery (i.e., did not take a step to recover balance). These differences may exist due to greater muscular strength of the athletes, improved sensory awareness through practice, and more efficient neuromuscular strategies of balance recovery (Brauer et al., 2008). Each of these benefits can be important factors for preventing falls in older adults and if combined, the effect could potentially be magnified.

## **Conclusion**

This literature review identified and described the differences between sedentary and highly active lifestyles of masters athletes. The focus of previous falls research has been on risk factors and prevention through exercise, education, and multifactorial assessments. Sedentary lifestyles promote conditions like sarcopenia and osteoporosis. Active lifestyles maintain muscle strength, improve balance, and build stronger bones. Exercise, specifically balance and resistance training, can prevent falls. Exercise is a component of sport and masters athletes who are actively competing in sport train through exercise. A question can be drawn about a possible link between exercise as a method for falls prevention and an athlete’s experience with falls. Sport may not necessarily prevent falls but training and competitive events in many sports contain the components of falls prevention. For example, a cyclist’s training involves both muscle strengthening through pedalling and balance training to keep the bicycle upright. The increased risk for falls and injury in sport adds another interesting element to a masters athlete’s

experience. No known research was found on the subjective experience of masters athletes regarding falls risk. Since sport is also a rewarding means of being active at any age, the gap identified in literature and the purpose of the current study was to answer the question:

- What is the fall-risk experience of masters athletes actively competing in sport?

## CHAPTER III

### METHODS

#### **Study Design**

This study was approved by Western University's Research Ethics Board (Appendix A). The study process began with a piloting phase that allowed the lead researcher to familiarize himself with aspects of the research process. A convenience sample of three masters athletes were purposively selected through contact with faculty members at Western University who competed in sport at the masters level. As outlined by Burke and Miller (2001), the sole purpose of the pilot study was to allow the lead researcher to refine his interview skills, learn proper interview scheduling, learn effective question phrasing, and familiarize himself with accurate recording equipment use.

A hermeneutic phenomenology approach consistent with Max van Manen (1990) was used. Van Manen (1990) explains that hermeneutics is "the interpretation of experience via some 'text' or via some symbolic form" (p. 25). This approach holds that the writing process is centrally linked to the interpretation of the text by the researcher since writing puts thoughts into words. A paradigm is essentially a "worldview that defines, for its holder, the nature of the 'world,' the individual's place in it, and the range of possible relationships to that world and its parts" (Guba & Lincoln, 1994, p. 107). The current study was carried out through one paradigmatic framework that was consistent with aspects of both interpretivism and constructivism. At the foundation of interpretivism and constructivism is the belief that realities are different for each person depending on their experiences, but elements of these realities can be shared between individuals and among larger groups (Guba & Lincoln, 1994). The interpretive-constructive paradigm "focuses on understanding the individual as a unique, complex entity" and that his or her reality is not generalizable to another person's reality (Ponterotto, 2005, p. 128). Also important to hermeneutics and the interpretive-constructive paradigm is reflection that is brought to meaning through the language used by an investigator and a participant. Thus, these goals were used to uncover hidden meaning and sought to understand the fall-risk experiences of masters athletes who actively competed in sport in later life (Ponterotto, 2005). One-on-one interviews, as well as the hermeneutic process of connecting individual meanings with the meanings of the collective group, were used to accumulate

knowledge consistent with the interpretive-constructive paradigm (Guba & Lincoln, 1994). The lead researcher used personal reflection after each interview and throughout the entire study. These reflections were recorded in a journal and were used to help the lead researcher remain transparent about his biases and how these biases may have influenced the data or appeared in the interviews. Integrating these concepts into the study fit with the research question and provided a more meaningfully coherent and rigorous study (Tracy, 2010).

### **Recruitment**

Participants in the current study were purposively recruited. Inclusion criteria included: being at least 55 years of age, actively involved in either team or individual organized sports at any level (e.g., recreational, competitive, or elite), English-speaking, and not diagnosed with memory loss. Potential participants were excluded if they were younger than 55 years, were not actively competing in sport, were not English-speaking, or were diagnosed with memory loss. The lead researcher began the recruitment phase by contacting local clubs, leagues, organizations, and competitive events for masters athletes by telephone and email to discuss the possibility of inviting their athletes for recruitment into the study. Table 3.1 describes a full list of contacted clubs, leagues, organizations, and events.

Table 3.1

*Contacts for participant recruitment*

Club	Organization	League	Event
Ontario Masters Athletics for track and field	The Huff n' Puff Senior Fitness Association	Middlesex Masters Soccer League	2014 Hockey North America Winter Hockey League Finals
Triathlon Ontario	TriSport Canada	Ontario Masters Lacrosse	Subaru Triathlon Series
	Coaching Association of Canada		Storm the Trent
	Slo-Pitch Ontario Association		
	Ontario Senior Games Association		

Once permission was obtained in writing through an email from the organization, club, or league, the lead researcher provided the contact person with a template email (Appendix B), a recruitment poster (Appendix C), and a downloadable (.pdf) version of the letter of information that described the study in more depth (Appendix D). These three resources were then sent out to all possible participants by the contact person.

The lead researcher attended a National Masters Track and Field competition on July 12<sup>th</sup> and 13<sup>th</sup>, 2014, in Toronto, Ontario where he set up a large recruitment poster that was a scaled replica of the pamphlet that outlined details of the study along with his contact information. He stood by the poster and answered any questions that athletes had about the study. He did not initiate any interactions. Instead, he allowed people to approach him. The small pamphlets were given to those who expressed interest in being interviewed. Interviews were then scheduled around each participant's track event times, according to how much time they needed to prepare for a race or unwind after a race. After the lead researcher recruited each participant, he used snowball sampling and provided extra pamphlets to these participants after the interview to be passed on to their teammates, competitors, friends, and family who were interested in participating in the study. This way, all interested athletes were able to contact him directly for more information before committing to the study.

The initial plan was to recruit 10-15 participants from diverse sports, ages, and sexes. The purpose of this was to initiate the study with a variety of experiences and contexts from which to draw interpretations. However, after recruiting the first eleven participants and listening to their interviews, the lead researcher did not feel that data saturation had been reached. The variety of evidence from the 11 different sports included (triathlon, cycling, road running, field hockey, track and field [jump events, long distance runs, long distance walk, middle distance runs, sprints, sprint relay, and throwing events]) was too narrow. Further purposive and snowball sampling was used to recruit more participants until new insights could not be gained through further recruitment (Morrow, 2005). After recruiting 22 participants across 19 different sports, and listening to and transcribing their interviews, the lead researcher and the two senior research team members were satisfied that the data gathered was rich and that no new information would emerge (See Table 3.2 for the complete list of sports).

Table 3.2

*Summary of participants' of sport participation*

Team Sport (and number of participants from that sport)	Individual Sport (and number of participants from that sport)
Badminton (1)	Cycling (1)
Dragon Boat (1)	Formula race car (1)
Hockey (2)	Ironman (1)
Rowing (1)	Road Running (4)
Volleyball (1)	Swimming (3)
Field Hockey (1)	Track and Field- Jump events (long jump, pole vault, high jump) (3)
Track and Field- Sprint relay (1)	Track and Field- Long distance runs (5000m, 10000m) (2)
	Track and Field- Race walk (1500m, 5000m) (1)
	Track and Field- Middle distance runs (800m, 1500m) (5)
	Track and Field- Sprints (100m, 200m, 400m) (5)
	Track and Field- Throw events (hammer, shot put, discus, javelin) (2)
	Triathlon (7)

*Note.* 14 participants competed in two or more sports.

**Data Collection Protocol**

Before each interview, the participants were asked through the demographic questionnaire to identify themselves as ‘late-starters’ into sport, who did not compete in sport until they were over the age of 50; ‘re-kindlers’ who were involved in sport at a young age, took a break in mid-life, and re-initiated involvement in later life; or ‘continuers’ who were involved continuously with sport for most of their lives (Dionigi, 2005). This helped the lead researcher better understand the participants’ sport involvement history. In order to gain a comprehensive and rich set of data, one-on-one semi-structured interviews with open-ended questions were used. In his book about qualitative research design, John Creswell (2007) encourages “individuals designing qualitative projects to include new and creative data collection methods” (p.129). In response to this, at the beginning of each interview, the participant was asked to provide one sentence that described their experience as a masters athlete. The lead researcher’s own sport background led him to believe that as athletes, people sometimes become so focused on the act of competing that they



lose sight of why they are competing in the first place. This question was used at the beginning of the interview, realizing that this could help participants initiate reflection on their experience and find the right words to portray it. Another purpose of this question was to help the research team gain a better understanding of what sporting context, background, and values the participant brought into the current study, in a short and concise manner. Each sentence was used during data analysis.

Interviews were conducted at a time and location convenient for each participant. The participant had three options for the interview: 1) on-site when the lead researcher attended the National Masters Track and Field competition, 2) at their home or local public setting, or 3) over the telephone. Flexibility in the interview schedules “ensures an emergent design sensitive to the growing body of data” (Morrow, 2005, p. 255). Each interview was recorded using two handheld digital audio recorders (Sony MP3 Digital Voice IC Recorder). Since there was a great deal of interest from masters athletes across Ontario and transportation was not always available, telephone interviews were a viable option. The insights given by Burke and Miller (2001) on how to use telephone interviews effectively were followed in order to adapt the interview style. Setting the phone to the speaker setting with the two recorders nearby worked most effectively. Burke and Miller (2001) also suggested being highly organized with scheduling to ensure that calls were made at the agreed upon time to avoid re-scheduling conflicts. The interviewer provided feedback when necessary to clarify statements or expand on a response. A total of seven participants chose to be interviewed over the telephone.

Before each interview was conducted, participants were asked to read the letter of information and ask any questions before they gave written consent to participate in the study. They were also asked to fill out a demographic questionnaire (Appendix E) and a contact information cue card where they wrote down their name, address, telephone number, and email. This allowed for multiple methods of contact with the purpose of sending the transcripts to the participants for member checking, a strategy used “to optimize the validity of qualitative research findings” and ensure transcription accuracy (Sandelowski, 2008). The interview began with general questions to learn about the participants’ involvement in masters sport (Appendix F). After this, questions were used to invite stories about their past and present sport and fall experiences. When necessary, probing questions were used to inquire about more detail. The lead

researcher recorded field notes in a reflexive diary immediately after the interviews. This was specifically devoted to recording significant body language, gestures, pauses, silences, and personal observations that pertained to the interview (Caelli, 2001). To enhance the trustworthiness or rigor of the data, probes were used during the interviews by asking participants to clarify statements or expand on a story's details.

In keeping with the encouragement for new and creative data collection methods, each interview concluded with a reflexive exercise where the participant was asked to take a few moments to think and condense their experience with falls into one single word. These words were used along with the pre-interview sentences during data analysis to help bring meaning and context into the coding and hermeneutic process. After each interview was concluded, the participant was asked to choose a pseudonym that related to their sport but was completely unidentifiable to anyone.

### **Data Analysis**

The research team that participated in data analysis consisted of four members: the lead researcher (Dylan Brennan), two senior researchers (Dr. Aleksandra Zecevic and Dr. Shannon Sibbald), and a research assistant (Sara Franklin-White). The lead researcher transcribed 17 interviews verbatim and the research assistant completed the remaining five transcripts. For those five transcripts, the lead researcher re-listened to each interview while reading the transcript to ensure accuracy and added content that the research assistant missed. Silences, pauses, body language, and gestures, noted in the field notes, were added to the transcripts to provide a deeper perspective of context when analyzing the data (Caelli, 2001). After an interview was transcribed verbatim and all personal identifiers were removed, the participants were sent their transcripts by email or regular mail for member checking. They were each given nine days to review the transcript for accuracy and provide any additional comments. In combination with the clarifications mid-interview, this post-interview process helped “clarify what they [the participants] have said in interviews” as an “ongoing process that is integral to data collection” (Sandelowski, 2008). This practice helped “provide opportunities for additional data and elaboration that will enhance the credibility of the emerging analysis” (Tracy, 2010, pg. 844). After all 22 transcripts were complete, each one was read multiple times through ongoing data analysis to immerse and familiarize the lead researcher with the data (Morrow, 2005).

Simultaneous data collection and data analysis, whereby transcripts were read multiple times, interpreted, and more data collected through semi-structured interviews, helped the lead researcher gain an understanding of complete experiences. All transcripts were stored in NVivo 10©, a qualitative analysis software program, to keep all the data organized in one location (Ajjawi & Higgs, 2007).

Inter-rater agreement calculations are not regular practice in a qualitative study through an interpretive-constructive paradigm. However, as a highly qualified person in training, the lead researcher and the research team decided it was important and beneficial to determine research agreement calculation methods and explore the potential for their use. This was also to ensure the coding list was trustworthy for the coding and data analysis stages.

Literature on inter-rater agreement was diverse. Campbell, Quincy, Osserman, and Pedersen (2013) outlined a quantitative method that was applied to their sociological qualitative research. To calculate inter-coder reliability, the authors “divided the number of coding agreements by the number of agreements and disagreements combined” (p. 309). They also used a pre-determined set of codes at the beginning of their analysis rather than inductive coding. Miles, Huberman, and Saldana (2014) did not outline specific methods to calculate agreement but stated that agreement “should be within the 85% to 90% range, depending on the size and range of the coding scheme” (p. 85). Krippendorff’s  $\alpha$  coefficient is a quantitative and complex statistic that can be applied to qualitative research as it considers the role of chance (Campbell et al., 2013). However, this value assumes “that all codes have equal probability of being used. . . . [and] assumes that all coders have the same qualifications” (Campbell et al., 2013, p.309). Armstrong, Gosling, Weinman, and Marteau (1997) explained that some research teams may choose to meet to “discuss and negotiate agreements and disagreements about coding” (p. 598). Carey, Morgan, and Oxtoby (1996) used this method of meeting to discuss problems with the coding list, then revised the list, and repeated until they were confident in the coding list. Saldana (2009) noted that agreement and consistency in the coding process is important and recommended a percentage agreement in the range of 85-90%. However, he also noted that some researchers may rely on team discussions in order to come to an agreement about the coding list.

Knowing these possibilities, as a study researching through an interpretive-constructive paradigm, the research team decided that meeting to discuss disagreements with the coding list, then revising it based on the discussions was ideal. Additionally, the Krippendorff’s  $\alpha$  coefficient

value was calculated through NVivo 10© for agreement between the three researchers. This was important in pointing towards codes that warranted further discussion (Carey et al., 1996).

The hermeneutic circle was used to aide in the coding stages. The hermeneutic circle entails looking at the text as a whole, then reviewing and interpreting individual sections or parts, and relating back to the text as a whole in a repetitive, inductive coding process (Dowling, 2005; Wright-St Clair, Kerse, & Smythe, 2011). Manual open coding made up the first round of coding and ensured that the research team was fully submerged and familiar with the data. Two senior researchers, experienced in qualitative data analysis, and the lead researcher used the inductive content analysis method to move “from the specific to the general, so that particular instances [were] observed and then combined into a larger whole” (Elo & Kyngas, 2007, pg. 109). Open coding was used by reading through different transcripts and interpretive notes were added to the margins beside the text. After this, similar words were grouped into categories and sub-categories on a coding list in order to “provide a means of describing the phenomenon, to increase understanding, and to generate knowledge” (Elo & Kyngas, 2007, pg. 111). This way, an initial draft of the coding list was created.

To ensure credibility of the codes, the three researchers separately used the initial draft of the coding list on one transcript (Mr. Rusty). They did this to check that “no relevant data [was] inadvertently or systematically excluded or irrelevant data included” by using the chosen language of the initial codes (Graneheim & Lundman, 2003, pg. 110). Simultaneous coding, or “the application of two or more different codes to a single qualitative datum” (Miles et al., 2014, p. 81), was used when content was deemed to have more than one possible meaning. The lead researcher then reviewed the coded transcripts and determined what codes warranted discussion based on interview segments that were coded differently or codes that frequently overlapped by all three researchers. After meeting to discuss these issues, the code descriptions and examples were revised to make a second draft of the coding list. The research team then separately coded Ironman Grandma’s transcript and met to discuss disagreements. The code list was revised to a third version and code definitions for “Extrinsic motivation,” “Support system,” “Prevention (of falls, of injury),” and “Risk management” were made more distinct, as they overlapped too often in their application. After the fourth meeting, all issues with the code list were resolved and the research team was confident with the accuracy of the revised code list and the process used to

develop it. A condensed version (not including examples) of the final code list is available in Appendix G.

Using the final version of the code list, the lead researcher coded all 22 transcripts. To ensure coding consistency, the two senior researchers on the team coded 30% of the transcripts each. This also provided additional interpretations and perspectives for the lead researcher to reflect on while he coded. After all 22 coded transcripts were stored in NVivo 10©, the lead researcher analyzed each code individually. Then he compared each code to the data as a whole, with the research question in mind. In the process of generating meaning from the data, several strategies described by Miles et al., (2014) were used. First, Miles et al., (2014) described the strategy of “clustering,” which involves understanding a “phenomenon better by *grouping* and then *conceptualizing* objects that have similar patterns or characteristics” (p. 279). The authors noted that clusters are not always mutually exclusive and some may overlap. Clustering in the current study was done by forming categories, fitting data into them where applicable, and grouping the similar categories. Second, the strategy of “noting patterns and themes” is an intuitive act done by observing the data that repeated across several cases, or participants. This was done throughout the study by reading and re-reading the transcripts and making analytic memos about the noted patterns. As codes were clustered, they began to form the noted patterns. A third strategy, “counting,” involved counting the amount of times something is mentioned by the participants. Miles et al., (2014) explained that “there are three good reasons to resort to numbers: (1) to see rapidly what you have in a large batch of data, (2) to verify a hunch or hypothesis, and (3) to keep yourself analytically honest, protecting against bias” (p. 282). For the current study, the “motivations” codes and the “adaptations” code had a large amount of data so counting was used to see what the most common motivators, and separately adaptations, were while keeping the lead researcher analytically honest. A final strategy used was “subsuming particulars into the general.” This is similar to clustering and involves a “back and forth between first-level data and more general categories . . . [that] develop through successive iterations until the category is ‘saturated’” (p. 286). This strategy was used to develop and describe the experience of the participants by grounding the themes in raw data.

These initial patterns were then described by the lead researcher in what Miles et al., (2014) called a “narrative description” (p. 91). The lead researcher created a document with

supporting evidence from the data in order to better communicate with the other research team members how he was making sense of the data. Once each team member read this document, they shared and discussed their own ideas about the data in order to subject the initial patterns to skepticism and share counter examples to ensure the patterns were properly representative of the data set. This was described by Miles et al. (2014) as a step in data analysis that needs to be done “before [the patterns] can represent useful knowledge” (p. 278). The lead researcher reflected further on the data as analysis continued to progress and multi-layered meaning was revealed through the process of writing and re-writing reflective memos about the codes and patterns. These steps were taken in order to grasp what the main emerging themes were. According to van Manen (1990), “phenomenological themes may be understood as the *structures of experience*” (p. 79). Therefore, the themes that emerged acted as meaning units, or structures, that contributed to the collective fall-risk experience of the study’s participants.

## CHAPTER IV

### FINDINGS

This chapter will begin with a description of the study participants' demographic characteristics, including fall risk factors present in the study. Next, the fall-risk experience of the masters athlete participants was composed of five core themes: 1) Acceptance of fall-risk; 2) Learning; 3) Heightened awareness; 4) Resilience; and 5) Self-fulfillment. These five themes and their sub-themes will be described in detail. The chapter will then conclude with an aggregation of the findings interpretations made by the lead researcher.

#### 4.1 Study Participants

In order to better understand the voices of the participants, their demographic characteristics are outlined here. A total of 22 participants were included in this study from a wide range of sport involvement backgrounds. There were 15 male (68%) and seven female (32%) participants. The majority of participants (91%; n=20) were married, one was single, and one was divorced. They ranged in age from 58 to 84 and 68% (n=15) were retired. This group of participants was highly educated, with 15 indicating that they completed graduate/professional school, two graduated college, one graduated university, one finished some university, one had a high school diploma, and two had an education level of grade 12 or less (Table 4.1). A total of 11 participants (50%) were not taking any medications, while the remaining 11 (50%) were taking at least one medication (range from 1-4). Lastly, four participants rated their health as excellent, 13 rated good, and five rated their health as fair. The sentence that participants were asked to provide to describe their experience as a masters athlete, and the single word to describe their experience with falls are presented in Tables 4.2 and 4.3, respectively. In terms of team sports and individual sports, there did not appear to be a difference between the stories gathered.

Using the concepts described by Dionigi (2005), six participants self-identified as “re-kindlers,” 14 as “continuers,” and two self-identified as “late-starters” to sport. However, after learning about each participant's sport involvement through the interviews, the lead researcher re-categorized these participants. So, there were 13 “re-kindlers,” six “continuers,” and two “late-starters,” with one participant whose lifespan sport involvement history could not be confirmed (Table 4.4). This re-categorization was deemed important in order to assess and better

understand how the participants subjectively identified themselves versus how they would be objectively identified.

An example of a “continuer” was Mr. Centre (age 71), who competed in hockey since he was a youth with no break from active sport involvement, except when he was temporarily injured (Figure 4.1).

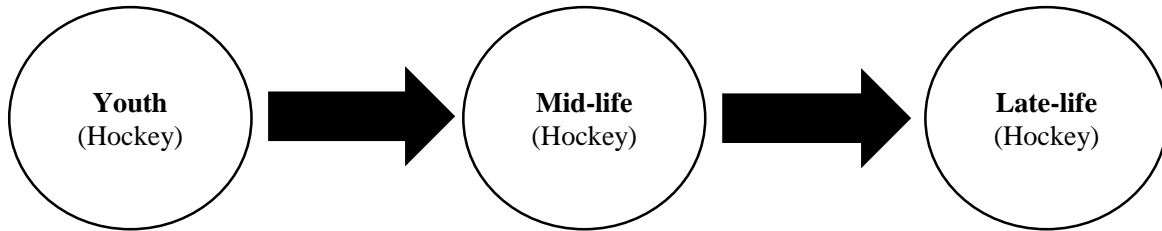


Figure 4.1. Mr. Centre as an example of a “continuer” in late life sport.

An example of a “re-kindler” was Ironman Grandma (age 66), who was strongly involved in youth sport then took a break from sport at age 18. The turning point that brought her back to sport was when she was 58 years old, her son challenged her to compete in a triathlon with him. She accepted the challenge and had been involved in competitive sport ever since (Figure 4.2).

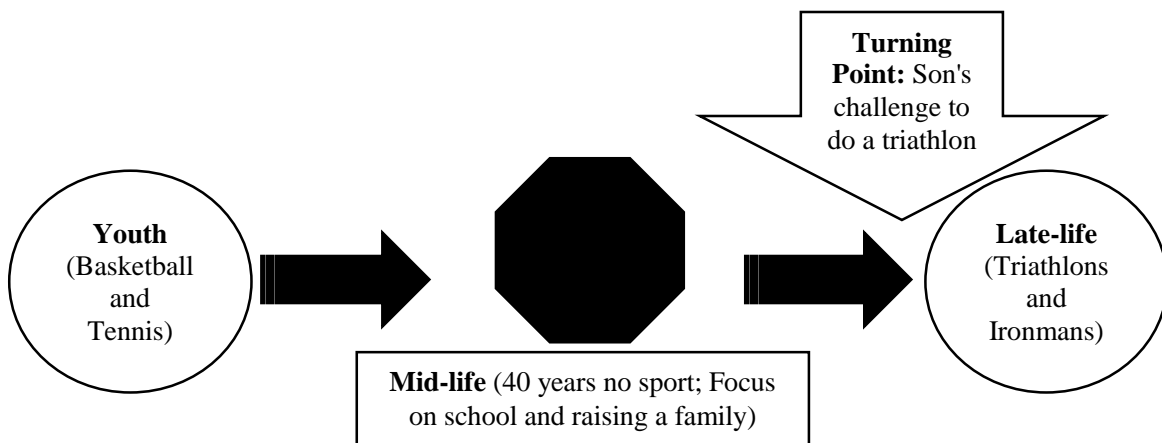
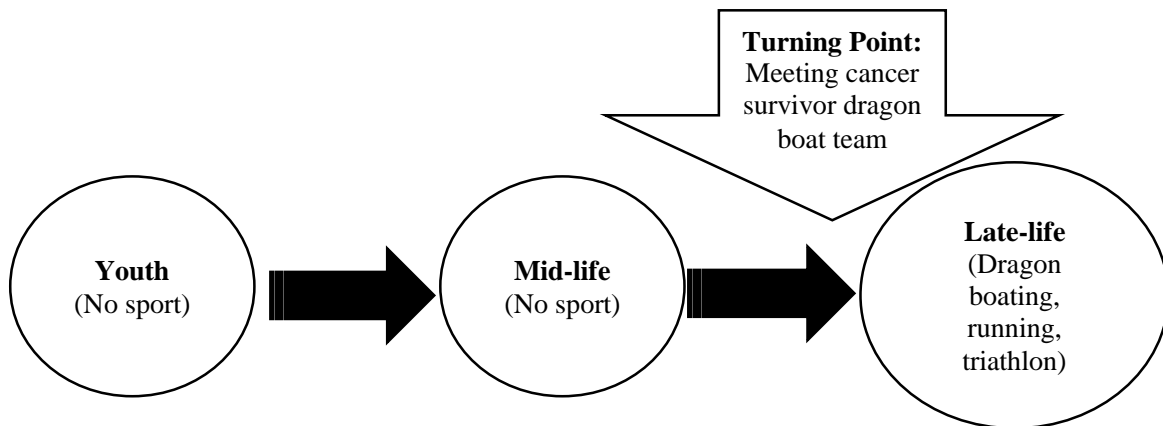


Figure 4.2. Ironman Grandma as an example of a “re-kindler” in late life sport.

An example of a “late-starter” was Mrs. Dragon (age 77), who was not involved in youth sport. As a breast cancer survivor working for a cancer organization, the turning point that brought her into sport was when she was introduced at a conference to an all-female dragon boat team made



up of breast cancer survivors. She was asked to join them for their annual dragon boat event. After she did this, she was so inspired by the other participants that she went home and at the age of 58, started her own dragon boat team of breast cancer survivors to help with post-cancer rehabilitation. Her sport involvement then expanded into running and triathlons in order to build her physical fitness to perform better in dragon boating (Figure 4.3).



*Figure 4.3.* Mrs. Dragon as an example of a “late-starter” in late life sport.

Table 4.1

*Participant Demographic Characteristics*

Pseudonym	Gender	Age	Occupation	Chronic Conditions	Sport(s)
Ms. Backstroke	Female	58	Social Worker	Arthritis	Swimming, Volleyball, and Triathlon
Mr. Bill Oar	Male	64	Chief Risk Officer	Slight High Blood Pressure (BP)	Rowing, Triathlon
Mr. Cannondale	Male	58	Accountant	None	Triathlon and Road Running
Mr. Centre	Male	71	Delivery/Truck Driver	High BP	Hockey
Mr. Circuit	Male	74	Military/ Current Affairs Media Commentary	Hypertension; cholesterol	Semi-Pro Formula Car Racing
Mr. Decathlon	Male	60	Inventor	None	Field Hockey and Track and Field (T&F)- Decathlon
Ms. Doc Swim	Female	68	Priest/Chaplain Educator	Neutropenia; Asthma	Swimming
Mrs. Dragon	Female	77	Registered Nurse/Adult Educator	Breast Cancer survivor; High BP	Dragon boat, Running, and Triathlon
Mr. Dual Sport	Male	59	Mortgage Broker	None	Triathlon, and Cycling
Ironman Grandma	Female	66	Christian Counsellor	None	Triathlon, Ironman, Run
Mr. Jump Master	Male	58	Accountant	Borderline hypertension	T&F- Jumping and sprint events
Ms. Love	Female	61	Teacher	None	T&F- Sprints and Sprint Relays
Mr. Pentathlon	Male	81	Chartered Accountant	None	T&F- Sprints and Long Jump
Mr. Racquet	Male	84	Education Officer	None	Badminton
Mr. Rusty	Male	67	Teacher	None	T&F- 800m, 1500m, 5000m and Road Running
Mr. RW	Male	70	MGMT Consultant	None	T&F- 1500m and 5000m Walk events
Mr. Speed	Male	71	Scientist	High cholesterol; mod. High BP; aortic valve replacement	T&F- 400m, 800m, 1500m
Mrs. Stanford	Female	58	Office Marketing and Customer Relations	None	Swimming
Mr. Sunny	Male	80	Manager	Some Arthritis	Running

Mr. Theo	Male	74	Clinical Chemist	Osteoarthritis	T&F- 1500m, 5000m, 10000m
Ms. Throw	Female	59	Disability Advisor	Brain injury (traumatic); asthma; hypothyroidism	T&F- Throwing events
Mr. Triathlon	Male	69	Supervisor- Paper Mill	None	Triathlon, and Hockey

Table 4.2

*One Word that Describes the Participant's Experience with Falls*

Participant Name	Chosen Word
Ms. Backstroke	Avoid
Mr. Bill Oar	Acceptable
Mr. Cannondale	Learning
Mr. Centre	No-Problem
Mr. Circuit	Lucky
Mr. Decathlon	Painful
Ms. Doc Swim	Painful
Mrs. Dragon	Minimal
Mr. Dual Sport	Embarrassing
Ironman Grandma	Yuck
Mr. Jump Master	Carelessness
Ms. Love	Non-existent
Mr. Pentathlon	Cautious
Mr. Racquet	Cautious
Mr. Rusty	Inevitable
Mr. RW	Confident
Mr. Speed	Scary
Mrs. Stanford	Careful
Mr. Sunny	Frightening
Mr. Theo	Shock
Ms. Throw	Surprising
Mr. Triathlon	Daunting

Table 4.3

*One Sentence to Describe the Participant's Experience as a Masters Athlete*

Participant Pseudonym	Chosen Sentence
Ms. Backstroke	I feel I'm most happy when I'm participating in sports, it's one of the happiest events for me in my general experience as a retired older person, I look forward to it, for me it's very social and I love that part.
Mr. Bill Oar	It's been a satisfying experience probably because of the age categories that I compete in.
Mr. Cannondale	Being a masters athlete is very fulfilling in that I am able to compete at a very high level while maintaining a really excellent level of health and I do that so that I'm able to accomplish day-to-day tasks a lot easier and if I want to do something different, . . . I just don't have to think about it so I enjoy that level of fitness.
Mr. Centre	Enjoyment and camaraderie with the rest of the guys and just playing the sport.
Mr. Circuit	The joy of competing with much, much younger athletes.

Mr. Decathlon	It's very fulfilling.
Ms. Doc Swim	Masters swimming Canada: Fun, participation, and fitness.
Mrs. Dragon	Challenging demands . . . additional physical ability that I previously had and it's performed in a beautiful surrounding on the water on the lake, which I love.
Mr. Dual Sport	Finishing my first try-a-triathlon.
Ironman Grandma	Being a masters athlete is a journey between the fear of what am I doing and the joy of I can't believe I'm doing this.
Mr. Jump Master	The experience has been very invigorating and it's made me very enthusiastic.
Ms. Love	I love the competition, the friendships, and getting better.
Mr. Pentathlon	I think being able to participate and enjoying the companionship of the people that I'm involved with.
Mr. Racquet	It's very competitive.
Mr. Rusty	I would say it's challenging, it's interesting, and it's rewarding.
Mr. RW	Personally rewarding and neat that I can still compete and win, or sometimes win.
Mr. Speed	I do track and field because I find it a fun experience since an early age.
Mrs. Stanford	My experience is extremely rewarding, lifelong social, [and] a great spot to practice something that I love to do.
Mr. Sunny	I guess the best answer I can give is that I don't see myself as a masters athlete, I see myself just as anyone who wants to do something that is positive with their life.
Mr. Theo	As a masters athlete, it gives me a reason to get up in the morning, it gives me a reason to come to competition, and it's social as well.
Ms. Throw	Wonderful, it's been really good, I re-started track and field and maybe other things but it's made me less depressed and so it's improved my life.
Mr. Triathlon	You always have to have some sort of something in your life that you enjoy doing and if you're lucky enough to find something that you really enjoy doing and it has physical benefits, then you can pursue it because there are no limits.

Table 4.4

*Identification of Participants' Sport Involvement*

	Participant Self-Identification	Lead Researcher Re-Identification
"Re-Kindler"	6	13
"Continuer"	14	6
"Late-Starter"	2	2

*Note. One participant missing in re-identification due to unknown history.*

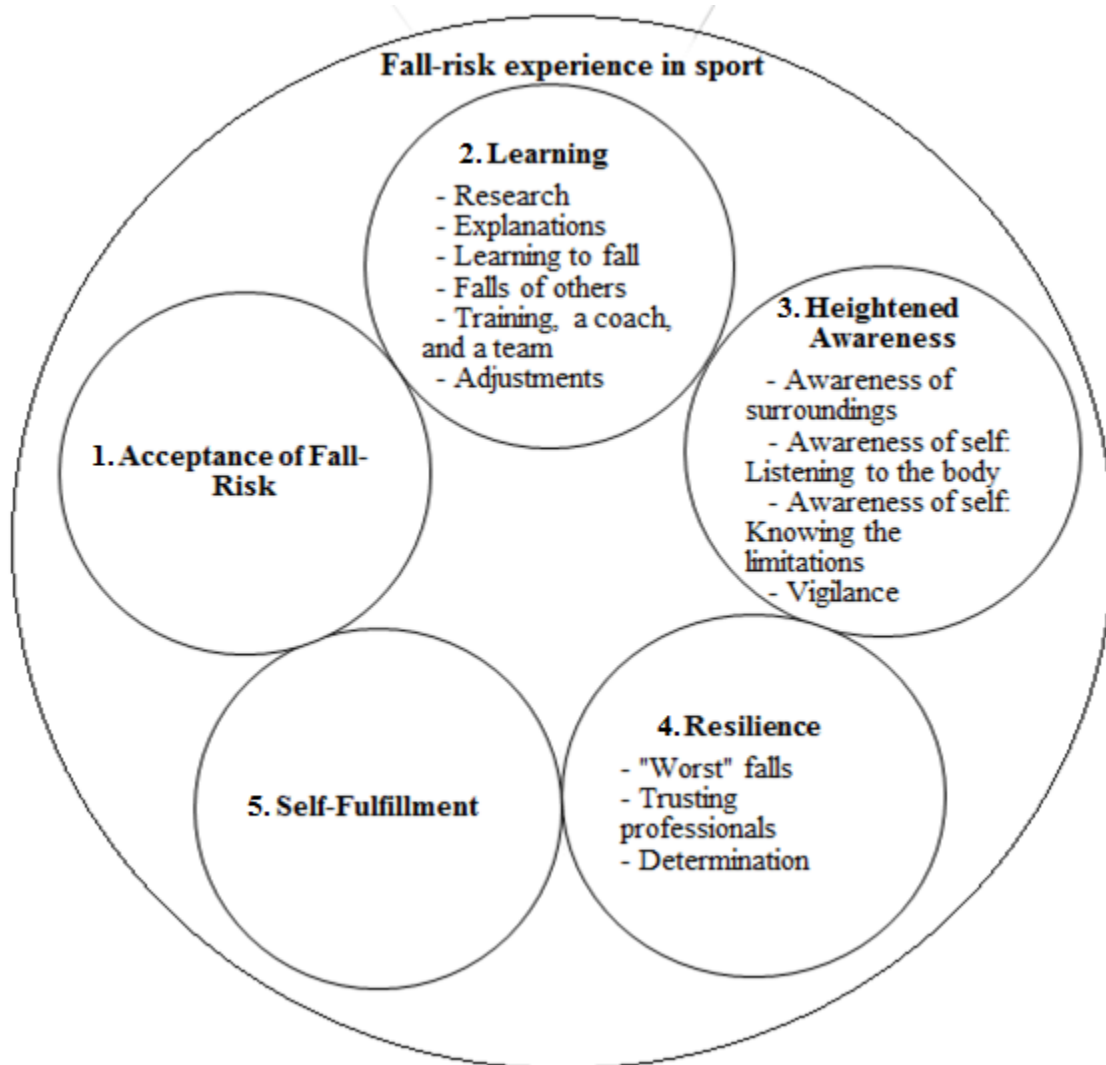
### 4.1.1 Fall Risk Factors

A final list of characteristics of note was the presence of fall risk factors in this group. There are hundreds of risk factors for falling but the more prominent ones were included as questions in the demographic questionnaire. These will be presented here. Four participants indicated they had excellent vision, 12 had good vision, five had fair vision, and none indicated they had poor vision. For their “Fall History,” nine indicated one fall in the past year, four had fallen more than once in the past year, one fell regularly (i.e. monthly), and eight wrote ‘Other.’ Seven of the participants who wrote ‘Other’ indicated they had not fallen in the past year or more, and one indicated the last fall was three years ago. The majority of the group (n=17) was ‘very confident’ they would not lose their balance or become unsteady while walking, three were ‘confident,’ one was ‘somewhat confident,’ and one was ‘not at all confident.’ Seven participants indicated they had been injured due to a fall in the last five years and 15 indicated they had not been injured due to a fall in the last five years.

Weak muscles in a person’s lower extremities is another risk factor for falls. Many of the participants from this study actively trained and worked out their lower extremities. The sports the participants competed in required strong and powerful muscles in order for them to compete. Lastly, although not explicitly asked, some participants described their fears of falling, both in sport and outside of sport. Their fears seemed to stem from the pain of past falls and the potential for injury, which would set them back from competing in sport and doing what they normally did. However, their confidence in not falling overrode their fear and they continued to partake in activities they perceived as risky despite their fear.

## 4.2 Emergent Themes

The five core themes of this study are illustrated in Figure 4.4. This illustration is not meant to be taken as a generalizable theory or model. Rather, it is meant to provide an illustration to help visualize how the structures of the experience (van Manen, 1990) for this group of masters athletes came together as interpreted by the lead researcher. The circular design is meant to signify the interrelationships of the five core themes. Each theme leads into the next theme. For simplicity, the theme explanations provided here can be followed by beginning with the “Acceptance of Fall-Risk” circle on the figure.



*Figure 4.4.* Conceptualization of the fall-risk experience of masters athletes actively competing in sport, representing five core themes.

Miles and Huberman (1994) explained that “we represent much of what we think or remember either through propositions or through stories” (p.301) but for qualitative research, the stories need to be combined with conceptual content, or interpretation, in order to properly report findings in this manner. What follows are the five core structures, or themes, of the fall-risk experience (Acceptance of fall-risk; Learning; Heightened awareness; Resilience; and Self-fulfillment) as explained through a narrative story in the words of the masters athlete participants. Although unorthodox, the decision was made to tell the story through quotes from study participants. There is a greater representation of the male perspective in the content of the stories due to the greater representation of males in the study sample. All participants were quoted at least twice and the longer interviews were quoted more since there was more content to draw from. Each theme concludes with a paragraph explaining the lead researcher’s interpretations.

#### 4.2.1 Acceptance of Fall-Risk

The masters athletes who participated in this study had a general acceptance for the risk of falls in their sports. This theme included the following codes and sub-codes: Awareness, Falls Experience, Fear, Prevention (of falls, of injury), Risk Experience, Risk Management, and Worldview. Whether or not there was a conscious effort put forth to avoid falls, it became clear that falls were an inherent component to their participation in sport: “it’s like anything else. I mean . . . there’s risk to a certain extent in most activities and . . . you gotta consider them and . . . then put ‘em behind you” (Mr. Pentathlon; age 81). Mr. Centre (age 71) expressed that in hockey “it’s just part of the game. I might get knocked down, I get right back up.”

Mr. Triathlon (age 69) said: “well, [what] they say about bike riders is there’s only two kinds: those who have fallen and those who will.” Prior to this, he described a fall that he experienced while biking in a triathlon where he fractured his clavicle and dislocated his shoulder. His recognition that falls were inevitable in his sport did not prevent him from his continued participation. Mr. Theo (age 74) shared a similar insight for running: “...falling happens! . . . if you’re a runner, particularly if you run at night, you’re going to fall.” Mr. Theo (age 74) described multiple occasions where he had fallen while running, such as the start of one of the marathons and on a run at night when his shoelace got caught on a piece of rebar near a



construction site. He was a firm believer that falls just happened, so he accepted the risk and continued with his activity.

Mr. Rusty (age 67) talked about falls while running in the summer months: “I never worry about it. No, I just don’t!” He went on to explain his acceptance of fall-risk when running through trails:

It’s just the nature of the beast! I mean if I’m doing a trail run, I am every once and a while, not often hopefully, but once and a while I’m going to trip on a root or something! I mean . . . even if you’re looking as close as you can, once and a while you’re gonna go down. It’s not the end of the world!

Mr. Rusty (age 67) felt so strongly that falls were an expected part of sport that when asked to condense his experience with falls into one word, he chose “inevitable.” Mr. Rusty (age 67) seemed to accept that falling could happen at any moment when running through trails but this did not deter him from his training.

Another participant, Ironman Grandma (age 66), expressed her concern but also her acceptance of the risk of falling on trail runs: “I don’t like trail running just because I know that I’m more clumsy . . . [near] roots and . . . that kind of stuff . . .but I think at the end of the day I am willing to accept the risk that’s inherent in the sport.” Throughout the interview, Ironman Grandma (age 66) did not say that she had fallen while running trails in the past. She acknowledged that multiple risks were present and chose to train on trails regardless. It seemed that her love for the sport helped her accept the risk of falling.

Mr. Bill Oar (age 64) was very confident that he would not fall, a belief that many other participants shared. He talked about a time when he biked down a perilous hill at a very high speed:

And this car or this truck with a trailer blasted his horns and all of the sudden I realized I’m on the edge of the pavement and I’m going I’m probably going in the high 50’s [kilometers per hour] by then and I’m going okay and I’m trying to hang on and then I say well, I’m not even thinking about falling, but I’m going okay, I don’t have to be on the edge of the pavement. I can go into the gravel. There was like a footpath of gravel so I went into the gravel and I started you know fish tailing a bit and still in pretty good

balance and then I remember I thought well if I fall, I'm just gonna fall, that's okay. I'm not gonna get run over. I will get banged up maybe but that's okay.

In this example, Mr. Bill Oar (age 64) oscillated between describing what he did during his close fall encounter and describing his thoughts of acceptance of the potential risks. While trying to regain control of his bike, falling remained his secondary concern. When he eventually did consciously acknowledge the chance that he could fall and get injured, he accepted this knowing that the consequences were less severe than the risk of being run over by a vehicle. This acceptance helped him stay focused to get back onto the pavement to continue his ride. Mr. Bill Oar (age 64) partially attributed his acceptance for falls-risk to his personality: "I'm a bit of a risk-taker so I don't mind being out on the edge with that potential fall that could happen." Being comfortable around risk implied a certain level of confidence in his ability to manage it.

Mr. Bill Oar (age 64) also made this interesting comment: "I've never been conscious of falling until you sent this thing out [referring to the letter of information about the current study]...I thought I'd only fallen once in the last little while but I've fallen 14 times! I just didn't consider it falling. I just thought it was part of the sport!" Mrs. Dragon (age 77) felt the same: "well truthfully, I never thought about it 'til I saw your questionnaires and your topic." These comments clearly showed that with confidence, falls became just another aspect and risk inherent in sport.

Overall, it seemed that the masters athletes exhibited an acceptance for the risk of falling in their sports. The confidence they had in their physical abilities to stay on their feet or recover after a fall appeared to play a substantial role in their acceptance of risk. Some participants explicitly made this known, while others implied it by continuing to train and compete in settings with a high risk for falls, such as the trail runs. In this sense, they believed in themselves and continued forward. Their deep love for sport seemed to also positively influence their acceptance of risk. It did not appear to matter what obstacles they may encounter in sport, as long as they were still playing and competing. It was interesting that none of the masters athletes revealed a past or current desire to relocate to another sport because of the presence of risk. Even when the participants fell, their enthusiasm to train and compete suggested an acceptance of the inherent risks.

## 4.2.2 Learning

Learning played a significant role in the participants' lived experiences and they described numerous deliberate decisions that led to increased learning. This theme developed from the following codes and sub-codes: Awareness, Adaptations, Falls Experience, Fear, Late-life History, Mid-life History, Physical Setback, Prevention (of falls, of injury), Risk Experience, Risk Management, Support System, and Training. The participants described learning in multiple ways that were combined into six sub-themes. They are: 1) research; 2) explanations; 3) learning to fall; 4) falls of others; 5) training, a coach, and a team; and 6) adjustments.

4.2.2.1 Research. Before becoming involved in sport in late-life, many of the participants conducted background research in order to help them control the risk of falling or injury. For example, Mr. Cannondale (age 58) spoke about researching the importance of core strength in running and cycling where he did: "...a lot of research when [he] was younger about . . . what the significance of a tendon is, what the significance of a ligament is, the . . . muscle development, [and] how key core is in almost everything you do." As he explained this, it seemed that understanding how the body worked was essential to staying fit and safe. When he was able to comprehend the significance of different body parts, he appeared able to look ahead to his own sport involvement and effectively train his body.

Two of the participants described their use of the internet to help them answer questions they had about staying healthy and reducing the risk of injury. Mr. Circuit (age 74) had an aneurysm and used the internet to learn about safe lifting techniques when maintaining his race car:

By reading, Googling, et cetera discover that when I'm lifting heavy objects, items like an engine block or something from the small car, don't get carried away. It's only about 90 or 100 pounds. . . . you should keep breathing rather than holding your breath-it's one of the worst things you can do for an aneurysm.

Mr. Dual Sport (age 59) echoed the idea of using Google for research: "you know, do some research and . . . before I start that you know should I be stretching more? Should I be doing this? And you know like today you can Google anything!" In both of these examples, the

participants actively sought out resources online to answer their questions and learned how to reduce the chances of being injured before exposing themselves to risk.

Research was also used to help understand how to properly prepare the body for competition. Mr. Sunny (age 80), after watching a television program about Ethiopian barefoot runners, researched the proper running method and equipment to reduce the likelihood of injury:

I learned about minimalist shoes and bought myself a pair of [brand name] trail glove shoes . . . for the first two or three years of running in them I did not understand how important it was to be able to run on my toes, on the balls of my feet I should say, and most of my running now is on the balls of my feet and I don't have any problems with my knees, my shins, my feet are fine, [and] I don't have any problems with my hips.

Ms. Backstroke (age 58), a lifelong swimmer, learned how to refine her swimming technique in order to make up for her declining strength: "...for me, the science and the research really helps me to understand it. So I read a lot, yeah I do, I read a lot."

4.2.2.2 Explanations. For those who described a time they fell, explanations for the fall were sought. These were defining moments in their fall-risk experience. Participants wanted to know why they fell in order to avoid falls in the future: "How can I learn what went wrong? How can I avoid it in the future?" Mr. Theo (age 74). This method was also described by Mr. Rusty (age 67): "...that last time I went down, I don't know when it was, and I went back and looked and there was no reason for me to have fallen (laughs). There was none. I looked! It was just, I think my mind was probably off somewhere else." Mr. Rusty (age 67) went back to the location of his fall searching for an explanation. He could not accept that there was no reason for the fall so instead, he attributed the fall to being mentally distracted. Finding a reason was important in order to learn how to avoid falls in the future.

4.2.2.3 Learning to fall. Another method of learning that participants spoke about was learning through experience. In other words, some participants explained how they developed the skill to fall properly, or in a way that minimized injury, by drawing from their past experiences with falls: "I mean, what I've learned from [falls] first is to roll with it. Don't fight the fall. Go down, roll with it" (Mr. Theo; age 74). Ms. Throw (age 59) fell on a monthly basis, especially when she competed in her track and field throwing events, such as shot put and the hammer

throw. She explained that, “I usually fall well. I mean I don’t sort of remind myself that flick your arm back or fall gently or relaxed or something like that, but I fall and I understood not hurting anything, breaking anything when I fall.” She went on to explain that her reaction to falls had become automatic from her experiences with past falls. She knew how to brace herself for impact and minimize the risk for injury. Mr. Racquet (age 84) echoed this idea and said that when he fell, he would roll onto his shoulder and body. He learned to do this by watching his children take gymnastics and martial arts classes where they were taught techniques of how to prevent injuries when they fell. By watching them, his fall response became “instinct” and he said that his body and mind react to the fall.

By contrast, Mr. Bill Oar (age 64) attributed his falling methods to his involvement in football as a youth: “I think because of . . . playing football and the contact sports when I was young, I learned how to take hits, fall down.” When he fell as an adult, the skills he learned in his youth remained with him: “So I could see it, I could feel something was happening. If I knew I . . . needed to move a body part out to . . . cushion the fall, I knew, I knew how to do that. That was probably learned by experience, but I seemed to be aware.” Mr. RW (age 70) shared a similar story about a time he fell on ice when he was 68 and how his reaction was influenced by playing rugby as a youth:

I fell perfectly . . . like I was getting ready to fall and . . . fell on everything that wouldn’t hurt or that hurt the least and rolled . . . and stood up and that was . . . 30 years since my last game! . . . I really think . . . you have some of these memories inbred ‘cause . . . I don’t think it was what you do naturally and in that situation.

Mr. Circuit (age 74) was fortunate in that he was a trained parachutist and learned how to properly fall for his landings. He explained that “it’s a matter of getting your feet together and . . . rolling on your side and doing a roll as opposed to . . . just landing flat.” He then described a time he fell off a ten foot ladder and instinctively applied this falling technique to avoid serious injury. For him, falling came “naturally after all those years of parachuting.”

4.2.2.4 Falls of others. When asked what their experience was with falls, a few of the participants described the impact of seeing family members fall: “I’m conscious of falls and things like that because my parents used to fall” (Mr. RW; age 70). Mr. RW also said he was becoming more cautious as he got older because he was aware of the risk of hip fractures. He

attributed his lack of injuries in past falls to “sheer luck” and the constant work he put into training for track and field which he felt put him in better shape to avoid fall injuries.

Ms. Backstroke (age 58) said “my experience with falls? (pause) I don’t have a lot other than [falls of] other people.” She described in great detail a time when her 6’4” father fell in the shower in the middle of the night and could not get up on his own. When she and her husband tried to lift her father up, his height, weight, and the awkward size of the shower made it impossible for them to help. Being discouraged, she said “that was a traumatic event for me that I couldn’t get him up again. . . . I don’t want that.” It seemed that even if the masters athletes did not fall themselves, knowing or seeing someone who they loved fall had a lasting impression. The way they described these falls was almost as if they had been the ones who fell.

4.2.2.5 Training, a Coach, and a Team. Training and exercise was a central part of the participants’ lived experiences and many of them had extensive training programs. They followed them closely which put them in a better position to minimize injury risk and maintain optimal physical conditioning. This allowed them to avert falls and remain confident in their risk management strategies while training and competing.

Cross-training, whereby the participants trained and competed in multiple sports in order to improve overall performance, was a common element to training. They attributed much of their injury and fall risk management to this idea of cross-training since it helped improve their overall physical functioning without being too strenuous on the body. As an example, Mrs. Dragon’s (age 77) main focus was dragon boating but she would “run twice a week and go to yoga either once or twice a week,” as well as swim while also training in the boat. Mr. Centre (age 71) complemented his hockey games with walking, running, or biking hills on days he did not have a hockey game. Mr. Pentathlon (age 81) believed that “the spice [of training] is in variety.”

Mr. Decathlon (age 60) was the only participant who said: “I don’t train and . . . I don’t work out regularly. I just go out and compete and . . . play a game.” However, even though he did not train regularly, he explained that he did yoga bi-weekly, played field hockey once a week, competed in decathlons twice a year, and the pentathlon six to eight times per year, which sounded like he was still quite active. Mr. Racquet (age 84) also did not describe training on a

regular basis but he competed in badminton matches for an hour to an hour and a half four times per week.

An interesting element of training that many participants mentioned was their integration of balance, core, and muscle strengthening. Mr. Sunny (age 80) belonged to a running club but also went to a functional therapist once a week to try to improve his “serious osteoarthritis.” After two years, he explained that it changed his life and the functional therapist acted as his coach to “strengthen my running ability and also to improve my core strength and balance.” Ironman Grandma (age 66) explained that “I do a number of exercises based on one foot where I’m standing on one foot, you know, and strengthening that one leg down and so I think it helps with balance.” Ms. Love (age 61) described and demonstrated some of the routine exercises that her coach stressed were important for balance. These exercises involved balance combined with core strengthening. She also commented on how her balance had declined but yoga and the drills she did helped improve it. With these elements of cross-training in place to excel in sport, the masters athletes inadvertently also trained their bodies to avoid falls. Their balance practice in combination with the strength training and the opportunities to challenge their balance recovery through sport put them in a better position to avoid falls.

Receiving instruction for proper training methods became an important aspect of minimizing risk with this group of masters athletes. One way participants noted receiving instruction was by working with a coach: “there’s so many different things that . . . with a good coach . . . they set up a good practice so that you’re always . . . developing” (Ms. Backstroke; age 58). Ms. Love (age 61) had a coach who she revered and who knew her physical and mental limits almost as well as she did: “I have an excellent coach and I have such trust in my coach that if he tells me I can do something, I will believe him.”

Ironman Grandma (age 66) explained how she used to work with a coach and still applied what she learned from him on a regular basis: “I did have a coach in the beginning when I . . . was qualified to go to the World Championship, I got a coach and . . . I got the basics of what I needed to do, how I needed to set it up and . . . I’ve just sort of basically followed that same dynamic.” Mr. Bill Oar (age 64) was on a varsity rowing team when he was in University and coached a number of sports throughout his working life. When he took up rowing again, he worked with a coach to teach him the sculling technique, where two oars were used instead of

one. He then developed his own training program based on all he had learned from his past: “I was doing four things: I was running, cycling, swimming, and weights. I wasn’t killing myself because of the cross-training.” Ms. Doc Swim (age 68) belonged to a club with a coach but trained at a different time than the team, so she kept paper copies of workouts to use: “I save the workouts that we have when I’m swimming with the team . . . I save them so I can reuse them.” By contrast, Mr. Cannondale (age 58) had no coaching experience, so he researched and designed a training program on his own: “I was able to put together a good program and I really researched a lot. I spent a lot of time digging into better ways to train . . . and was able to stick with it and because of that, I think I’ve been able to prevent a lot of injuries.”

Training with a team became especially important for the participants who competed individually because it allowed them to exchange their knowledge with other athletes: “that’s the other beauty of masters is everybody helps each other, you know? I’m always helping people. People above me help me” (Mrs. Stanford; age 58). Mrs. Dragon (age 77) trained on her own to build endurance for dragon boating and twice a week she trained with her team: “. . .dragon boating you do train, you practice as a team, you practice as a group.” Training alone, with a coach, or with a team helped the masters athletes maintain optimal physical functioning, which in turn minimized their risk for injuries and falls.

4.2.2.6 Adjustments. After participants fell or saw other people fall, from that point forward they made adjustments to how they competed, how they trained, and how they controlled their bodies in order to reduce the chances of falling. Mr. Sunny (age 80) made adjustments in the middle of running a 10 km race: “I got a very severe cramp in my right calf, so severe that I barely could stand. Somehow or other, I was able to massage it out and start walking at a slow pace and eventually I was jogging again and quickly I was running again.”

Mr. Jump Master (age 58) explained how he became aware of his aging body and that he knew his “new limitations” compared to when he was a younger athlete. Competing in jumping events where falling was actually part of the sport, he said, “I have to establish new standards for how high I can jump, [and] what barrier I can go over.” He also described the adjustments he made to his training program whereby he added many different elements like weight lifting, “dry land training,” and track-specific training in order to add variety and maintain muscle power.



Ironman Grandma (age 66) explained that after she fell off her bike twice and broke a collarbone each time, she doubted whether she could keep training and competing. However, rather than giving up she decided she had to “adjust that mental plan from the physical plan.” After she adjusted her mindset to keep moving forward, she then had to adjust her training program: “for example, okay I’ve got a broken collarbone. I can’t ride out on the road so that means I set up my bike on the trainer and I start doing the workout almost the same as if I was on the road but I’m on my trainer indoors.” So for her “it’s just adjusting. It’s constantly adjusting to fit whatever the health issue is or you know breakages, or whatever.” She described four falls, three of which resulted in fractures or serious injury. She viewed these falls simply as “speedbumps” that she had to adjust to in order to find a way forward.

Ms. Backstroke (age 58) explained that her tactics and strategy playing volleyball had changed a lot since she was a youth:

I’m much more cautious. I’m not as . . . fearless . . . you know you can go dive for a ball or run . . . hard and then dive and I don’t do any of that anymore. I really don’t. I play differently, I’ve adjusted how I play. . . . I’m not into being that much of a star that I have to . . . hurt myself to get a ball in a game like I’ll just say ‘oops, that’s too bad.’

Mr. Bill Oar (age 64) noted that he physically moved his body as he fell to reduce its impact: “I don’t know . . . if I slowdown in terms of my mental process but I can focus and I can see what’s happening . . . and I adjust to it versus just going [down]. Like I don’t go limp, you know, I get ready for the contact when it’s gonna happen.”

One adjustment that was mentioned by six of the participants was the need for rest: “when you are hurt, I think you gotta rest, you gotta give your body a rest” (Mr. Rusty; age 67). Mr. Centre (age 71) said that he tried to “relax” as much as possible. Ironman Grandma (age 66) described the importance of rest in her life: “I do rest. I mean I’m fortunate because I’m retired, I can . . . do my five hour bike ride and come home . . . and have a hot bath and crawl into bed.” She went on to explain how she spent a lot of time laying down with her feet elevated because it felt good after working them so hard in workouts.

Mr. Decathlon (age 60), by contrast, was the only participant to explain that he did not make adjustments. Rather, he said, “I just keep pushing. Yeah, if I told my body how old I was, I wouldn’t be doing it. So I’m fooling my body. I’m just pushing all the time.”

In summary, to be able to accept the risk for falls in sport, the participants acquired new knowledge and skills and developed risk management strategies. When they actively researched effective training regimes, their actions were planned and deliberate. They looked for explanations for falls in order to learn how to prevent similar situations in the future. They also learned from others and applied these lessons to their own lives. The theme of learning appeared again and again, whereby participants were able to learn and re-learn new skills and knowledge through their experiences and involvement with sport. Once they learned something new, they were able to make adjustments to their plans and actions in order to minimize risk and excel further in sport. In this way, the theme of learning played a major role in helping the masters athletes stay safe.

#### 4.2.3 Heightened Awareness

When the masters athletes fell or saw others fall, the lessons they took from those events were applied to other situations they encountered, such as running in icy conditions or trail routes where they fell in the past. This led to the theme of heightened awareness that comprised of four sub-themes: 1) awareness of surroundings; 2) awareness of self: listening to the body; 3) awareness of self: knowing the limitations; and 4) vigilance. This theme and its three sub-themes emerged from the following codes and sub-codes: Adaptations, Awareness, Falls experience, Fear, Physical setback, Prevention (of falls, of injury), Risk experience, and Risk management.

4.2.3.1 Awareness of Surroundings. Several participants discussed their falls and described how they became more aware of their immediate surroundings in order to prevent falls. Mrs. Dragon (age 77) spoke about a change she made when running: “I think as I have aged, I’m more aware of . . . the risk of falling in many circumstances.” Mrs. Stanford (age 58) explained how many of the older ladies on her swimming team were starting to lose their balance on the raised diving blocks and needed assistance at races. Witnessing this made her more aware of her own balance and she was “definitely becoming more careful about being on the blocks.”

Several participants reported watching where they were going while training and competing. Mr. Dual Sport (age 59) explained his need for awareness of what was in front of him while running to avoid falls: “. . . being more aware of . . . what’s in front of you. Not to say that . . . anybody runs blind, you know, close your eyes and run, right? But just . . . making certain that you don’t put yourself into a position where you can fall.” Mr. Cannondale (age 58) also made a point of looking for obstacles so that he could avoid them: “I think it helps me to get a little bit more of a big picture when I’m running or cycling and make sure that I’m aware of what’s around so that I don’t fall.” He went on to describe several situations where being attentive to his surrounding environment was important:

It pays to be cautious and it pays to be aware of your surroundings, whether it’s where your foot is going to impact the ground, whether it’s . . . how fast you’re going on your bike relative to conditions, . . . or you’re on the bike path with a whole bunch of pedestrians . . . you have to pay attention. . . . when I’m on my bike and I’m doing 35 or 40 or more kilometers an hour on a road on little thin tires . . . the margin for error . . . is not in your favour in a lot of cases so you want to make sure . . . you have a good grasp of your surroundings.

Mr. Cannondale (age 58) was an athlete who did a lot of research before competition in order to be properly prepared to manage risks. He also had a few injurious falls off his bike and while running through trails. The combination of research and past experience with falls led to Mr. Cannondale’s (age 58) thinking that it was important to have a “good grasp” of his surroundings. Mr. Triathlon (age 69) did not describe any falls when running through trails, but he did explain the importance of being aware in that environment when he trained:

You just have to be aware of . . . roots and stones . . . especially if you’re running through trees and sunshine is coming through because then you have . . . a dappled landscape, so to speak. So you just have to be aware of the terrain that you’re running on and . . . be aware of the surfaces you’re running on.

He also spoke about biking in different weather conditions: “going around corners, you just have to be aware that if it rains, it’s going to be slippery. If there’s gravel, it’s going to be slippery so just be aware of what you’re going into.”

Four participants (Mr. Jump Master, Mr. Theo, Mr. Rusty, and Mr. Cannondale), by contrast, mentioned times when they were unaware of their surroundings. On one such occasion Mr. Jump Master (age 58) fell while walking and texting on his phone. From this experience he learned that “I have to be a little more aware of things that are like 20 feet ahead of me . . . so I think at this age, I can still overcome . . . by being more careful and paying more attention to details of my environment and my surroundings.”

4.2.3.2 Awareness of Self: Listening to the Body. Study participants described a highly effective means of listening to their bodies. They were able to distinguish discomfort from pain while they were training and competing, which helped them know when to slowdown or back off to prevent an injury or fall.

Ironman Grandma (age 66) explained that she “can tell when things are not working well, you know, you can feel it.” Mr. Cannondale (age 58) described his close relationship with his body and how he was able to sense when he needed to make changes to his training program: “my knees tell me when it’s time to buy new running shoes . . . my running can also tell me when I haven’t been doing enough core exercises because my back gets a little bit sore . . . I start to get . . . a little crampy if I’m not hydrated enough.” His experience with past injuries helped him identify when something was not right and he was “very aware of [his] body.” Mr. RW (age 70) similarly talked about joint problems that he currently had from playing rugby in his youth. He used those problems as a baseline for feeling when things were different. Mr. Decathlon (age 60) explained that since he started doing yoga ten years ago, “he can feel a lot of what’s happening” and he said “that yoga really puts me in touch with my body.” In this way, the participants were able to constantly compare and contrast how they felt in order to sense when something was wrong or in the very least, different.

Mr. Triathlon (age 69) found that his method of listening to his body was hard to put into words. He described the process as a form of “meditation” to help him “get through the pain and exertion” of a triathlon. He then said, “the only way I can put it is make a journey . . . through your body and . . . see what is hurting, whether you can relax it or not.” Mr. Triathlon (age 69) trained alone, so he checked his heart rate and listened to his breathing in order to know if he was overworking. Mr. Sunny (age 80) was able to sense what his body was doing when he ran: “I feel

it all the time [referring to his body] . . . I have an awareness with every step I take of where I'm at in the run, of where my body is." (Mr. Sunny; age 80)

Ms. Throw (age 59) was in a "near fatal car accident in 1981" and as a result, was in a coma. She explained that when she came out of the coma, "I had to learn how to do things or to cope with what I wasn't able to do and do it quite differently so that . . . you know your body more so [as] a result of that." She had to re-learn how to walk and in that process became very familiar with what her body could and could not do. One of the things she learned that she could not do was sense where her feet were: "I'm so clumsy on my feet now and I used to be clumsy before [the car accident] but I don't know where my feet are and it's called . . . proprioception." In this sense, she still listened to her body but not all body parts were able to respond, making her means of listening much less effective than the other participants.

**4.2.3.3 Awareness of Self: Knowing the Limitations.** In the process of listening to what their bodies were telling them, participants became aware of their physical and mental limitations. They were acutely aware of what could happen if they passed their limits. For this reason, they made conscious efforts to stop whatever they were doing when they passed their limits in order to prevent harm to their bodies.

Mr. Racquet (age 84) said he was able to identify when his body did not feel right and explained the importance of knowing his limitations: "I'm reminded very constantly that I'm, you know, 80-plus. I'm 84. You're no longer a teenager, be careful! Know your limitations . . . yes, we've got to be very careful about our limitations." Similarly, Mrs. Dragon (age 77) described how she allowed her body to lead her through her training: "if I feel there is something not right . . . I'm attentive to that, I pay attention to it and . . . sort of look... am guided by how I'm feeling." In this sense, she knew where her limitations were and listened to her body while training to ensure she did not exceed her limits and get hurt. Mr. Dual Sport (age 59) explained that he focused on "just trying to stay within your . . . physical ability."

Mr. Theo (age 74) tracked his competitive performance times his entire life and in doing so, felt a very close relationship with his body to a point where he said, "I know what my body can do." Ms. Backstroke (age 58) explained the importance of taking care of her body: "like if it really hurts, I would stop. Like if something's hurting, I wouldn't push through an injury . . . I

don't have that mentality. I have the more of the 'hmm, let's stop and take care of that and make sure we can go another day.' You know? That's my mentality."

In recognizing their limitations, some of the participants explained how they pushed their bodies harder because they felt that they could. Ms. Backstroke (age 58) said "I know how far I can push it and yeah . . . I'm pretty good at it, I think." Mr. Bill Oar (age 64) said, "I could tell how far I could push my body" and his mind in order to achieve better results in rowing. However, he only learned this after pushing himself too hard in the past: "I did obviously push myself too far in running [marathons] and had my . . . hips replaced." Ms. Love (age 61) explained that when her body was hurting, "your body's telling you something, so . . . I have to listen to that." However, there were times when she knew her body was telling her to stop but she refused to listen: "sometimes we turn it off, we don't listen . . . you know you really push, you want something and . . . you know maybe it was not quite the wisest thing to do (laughs)."

4.2.3.4 Vigilance. The heightened awareness and the actual act of falling in certain situations led to the participants keeping careful watch for potential dangers and risks. They did this in similar scenarios to their past falls, but they also became more vigilant in general.

Mr. Speed (age 71) described a scene that was common to him in running road races. He explained that at the start lines there were many people shoulder-to-shoulder pushing for a better starting position. To remain safe, he said, "I'm very cautious in road races and in a large race . . . you gotta be very careful not to trip over or have someone catch your heel and that happens quite often." Mr. Speed (age 71) also described a time he tripped over a tree root and had to run home with cuts and scrapes. From that point forward, he said that his runs through the trails were "obviously slower" and that he had to be "more careful of tree roots." Similarly, Mr. Cannondale (age 58) explained what he learned after stepping awkwardly on a tree root:

I was running on a trail and . . . I got distracted by something happening ahead and I missed a root and stepped on the root, of course, and my foot stayed one way and my leg went the other way and I twisted my ankle . . . but it scared the heck out of me because . . . I had run these trails for years and years and years and now every time I get to the same spot, it's just 'okay, be really careful and watch now.'

The physical pain and the concern that he had about falling in an environment he was familiar with helped him to be more careful while running the trails and watch where he was stepping from that point forward. Ironman Grandma (age 66) broke one of her collarbones when her bike got caught in a railroad track. After she recovered and resumed bike training, she was more vigilant in similar environments: “I’m a bit more careful going over railroad tracks. I don’t fly over them.”

Mr. Theo (age 74) frequently ran through trails and also tripped over a tree root. However, he took action and made sure he eliminated that specific risk before he or someone else tripped over it again: “occasionally I go out with shears and cut the branches so my trails are clear and . . . I have actually cut out roots. Just gone in and cut them out because I just tripped over this root and I think, ‘dammit tree root! I just tripped over you! . . . So I just take it away.’”

Mr. RW (age 70) took a lot of pride in his “good” eyesight (with glasses on) and his ability to spot potential dangers. He stated that “I’m good at spotting stuff . . . I’m aware of what can . . . hurt me. . . . I don’t step on uneven walkways on purpose . . . I avoid them . . . I am good at spotting ice and what might be a problem and . . . I try to avoid it.” Mrs. Stanford (age 58) echoed this idea and said that when walking on the pool deck you have to “watch where you’re going.” Ms. Doc Swim (68 years old) credited her vigilance to over 25 years of working in a healthcare setting. She explained how pool staff were typically responsible for keeping the pool deck clear but “I’m always safety conscious of watching for something that might trip me or in fact if there’s stuff laying on the pool deck at the pool I will move it because . . . I don’t want to fall.” She also described a time where she tripped over her wheeled swim bag while walking down a ramp. She followed the story up by saying, “I usually am watching to make sure what’s uneven and what’s not so I’m very vigilant that way ‘cause I don’t want to fall.” Mrs. Dragon (age 77) also kept careful watch for potential trip hazards when she ran and stated that “with running . . . I probably watch where I’m running more carefully if . . . it’s an uneven surface or something like that.”

In competitions, Ironman Grandma (age 66) had reminders that kept her vigilant throughout a race:

I have a bit of a mantra that I . . . remind myself of in the course of a race and the first one is to swim relaxed . . . to bike smart. [It] didn’t work when I hit that young fellow’s

wheel but . . . bike smart, pay attention and not take huge risks . . . and to run with my head up so that I can see the obstacles.

In summary, with every fall or exposure to risky environments, the participants learned and when they reflected on such events, they gained further knowledge to mitigate their exposures to risk. It seemed that they had an almost intimate relationship with their bodies where they spoke as if they scanned the inside of their bodies to sense when something was not right. The same was true with their surroundings. They knew what was dangerous in their immediate surroundings, which helped them avoid such risks. As they shared more and more stories about training and competition, it collectively fused well into a theme of heightened awareness. The word 'heightened' was used because the participants were not just passively aware of risks. Rather, they had an active focus on their body and surroundings in order to stay safe. With an active focus, each subsequent exposure to risk was seen as increasing, or heightening, the degree of their awareness.

#### 4.2.4 Resilience

A theme that was readily apparent in the experiences of masters athletes was their resilience when faced with difficulties. This theme materialised from the following codes and sub-codes: Adaptations, Extrinsic motivation, Falls experience, Goals and plans, Intrinsic motivation, Mental setback, Physical setback, Social setback, Support system, and Worldview. The three sub-themes of resilience are: 1) "worst" falls; 2) trusting professionals; and 3) determination.

4.2.4.1 "Worst" Falls. It was interesting that when prompted to speak about their experience with falls, participants described their "worst" falls in great detail. They recalled the falls that led to injury, whether it was a bruise or multiple bone fractures. A few participants either forgot about their less consequential falls, or chose not to describe them in any detail. For example, Mr. Cannondale (age 58) described two falls that he said were "significant." One was a time when he was on his bike, collided with a runner, flipped over his front handlebars, and ended up with a very sore shoulder and arm for about a month. The other was the fall where he ran on a trail route and twisted his ankle. He went on to mention a time he fell while skiing moguls but since it was "nothing traumatic," no extra details were provided. Mr. Decathlon (age 60) said he only remembered "falling twice and there were major injuries." Mr. RW's (age 70)



initial response was also focused on a “bad” fall: “I had only one bad fall in the last two years.” Mr. Triathlon (age 69), who had plenty of falls both in hockey and triathlons, interestingly described them all as “the worst” because of the pain he associated with them.

Mr. Sunny (age 80) also had a focus on his painful falls: “I was catapulted off my bike. I was lying on the road with a completely shattered bicycle helmet, totally unconscious and when I was picked up by the police and the ambulance, I had no idea who I was or where I was going.” He also described two other falls when he was younger, one when he fell off the back of a moving pickup truck and one when he fell from a tree and landed head first onto a cement wall. However, Mr. Sunny (age 80), being an optimistic man, had a painful swollen bursa on his elbow that a fall helped eliminate: “I tripped and fell and hit my arm on the ground and it burst the [swollen] bursa, so it’s gone now, so not all falls are negative.”

A few of the other participants also had a positive outlook when they described their falls and setbacks because they kept their injury or challenging situation in perspective. When prompted about how he overcame setbacks, Mr. Triathlon (age 69) explained that “you just have to realize that you’ve been there before and this too will pass.” Mr. Pentathlon (age 81) said that to overcome setbacks, you “just put it behind you and start over again. . . . you know, you have the good times and you have the dumb times.” Ms. Backstroke (age 58) discussed the disappointment she had when she missed the opportunity to be on a great National swim relay team because of a knee injury. When faced with this setback, she reminded herself that “this too shall pass” and accepted the fact that “you know you’re going to miss out now but you’ll be back and it’s okay.” In this sense, the masters athletes adjusted their mentality to remain optimistic in the face of difficulty. This mental adjustment resulted in a resilience that helped the participants overcome their worst falls.

**4.2.4.2 Trusting Professionals.** In keeping with their resilient nature, the participants actively sought help from healthcare professionals, such as physiotherapists, chiropractors, dynamic functional therapists, massage therapists, and doctors, when they were injured by a fall or by other means. Their objectives in seeking help was not to give up control or responsibility for their health, but rather to retain control and have an expert assist them in getting back to good health. Mr. Cannondale (age 58) explained that after he had surgery to repair tendonitis in his ankle, he was not afraid “to go and get help.” He said that “going through physiotherapy was key

to . . . getting back as quickly as possible, and being diligent about sticking with the exercises and getting them done” was also important. Mr. Centre (age 71) also described the importance of getting therapy when he was hurt: “it’s just a matter of letting it set and doing the therapy on it and getting back at it.” After a “bad” fall where she tripped over an interlock brick and hit a concrete wall at a ski resort, Ms. Doc Swim (68 years old) fractured her elbow and needed surgery. She described how “it was months of rehab but . . . I mean it came back . . . I can’t straighten the arm completely but I have really good use of it.”

Ms. Love (age 61) had a deep appreciation for healthcare professionals and trusted a “team of people” to help her remain strong and competitive. Her team consisted of a coach, a massage therapist, and a chiropractor. She explained how they were “pretty influential” to her performance and “you gotta trust them. I have to trust that they know me . . . you have to trust their decision.” Mr. Jump Master (age 58) had a minor calf tear at the time of his interview and explained that he “went to physio[therapy]” and did everything the physiotherapist told him to do. He displayed his trust when he held back from running until he was “cleared to run.” Mrs. Stanford (age 58) explained that “because you do want to get back, you listen to what your physician says or your chiropractor or your physiotherapist and . . . work on that.” Ironman Grandma (age 66) used to have a difficult time getting her legs over her bike in the triathlon and Ironman transitions from bike to run. She was skeptical of going to a chiropractor at first but after her children urged her to go, she “discovered with going to the chiropractor that . . . he can help this out and so I was most delighted.” She continued to see him, as well as a massage therapist, on a regular basis while training and competing.

Mr. Bill Oar (age 64), by contrast, had very little trust in healthcare professionals. He explained that after his hip replacement surgery he “did go through some physiotherapy.” His physiotherapist told him that he recovered very quickly and Mr. Bill Oar (age 64) responded by saying, “that’s because everything you told me, I didn’t do. I did something else.” It was unclear why he distrusted the physiotherapist but in this example, Mr. Bill Oar (age 64) portrayed his distrust through his deliberate decision to refuse the advice of a healthcare professional.

4.2.4.3 Determination. The participants had a “keep moving” mentality to maintain proper function of an injured body part. They believed that in order to heal faster, they had to keep their injured area mobile. This might have been learned from the influence of the healthcare

professionals they placed trust in to help them get back to their sport. Ironman Grandma (age 66) verbalized this mentality when she explained that “when I was in physio with the last broken collarbone, it was like I . . . arrived right . . . off the tarmac and say, ‘okay, we gotta start working on this’ because I know what happens is we get frozen appendages . . . so we have to keep moving it.” After Mr. Decathlon (age 60) tore one of his quadriceps muscles and fell during a field hockey game, he said that the recovery “took me about six months of active work to get back.”

One of the attributes that influenced the participants’ resiliency was a firm resolve, which they exemplified both in competition and in recovering from injuries. Mr. Theo (age 74) explained that during a race, “even if you’re limping, you gotta keep going.” He described a time where he was pushed to the ground at the start of a marathon race by a group of over-aggressive runners. He was then trampled by the crowd of runners and when he got up, he noticed that he was bleeding from his hips, elbows, and knees. However, he thought “bloody hell, I’ve come all this way, I’m gonna run!” About the fall, Mr. Theo (age 74) then said, “I just roll over, pick myself up, and carry on! (smiles).” Mr. Pentathlon (age 81) used a metaphor of riding a horse to describe his mentality after falls: “It’s just like riding a horse . . . you’re gonna get bucked off or you’re not gonna get bucked off. In the end you . . . put it behind you and . . . you just proceed.”

When faced with serious injury or a health issue, the participants never gave up. An underlying motivation seemed to be their love for the sport. When some of the participants spoke about their health issues, they tended to focus on what they did and how long it took them “to get back,” referring to their return to sport. Mr. Centre (age 71) explained that “I’ve had two broken ankles. I had one broken in 1982 on October the 5<sup>th</sup> and I was back playing hockey in December. I had one broken in 2008 . . . and I was back playing hockey in . . . probably three months.” He also “had a triple bypass in [October] 2009 . . . the hockey season started the following July and I was back playing hockey.” After the fall that fractured and dislocated Mr. Triathlon’s (age 69) shoulder, he said, “but I was back playing hockey a month later.” Clearly their love of sport keeps them determined to recover.

The discomfort and pain associated with falls, health issues, and difficult workouts did not seem to deter the participants from continuing. When Ironman Grandma (age 66) fell off her bike and fractured her collarbone while riding over the railroad tracks, she said that after the fall

and the fracture, she “managed to bike the 20 kilometers home I think under . . . the guise of . . . adrenaline.” Whether or not the adrenaline had a profound effect, it took a very resilient and determined person to bike 20 kilometers with a fractured collarbone. When Mrs. Dragon (age 77) and her dragon boat team were in the water with wavy conditions, she said “I keep paddling . . . so I get short of breath but I . . . don’t stop because of that.” Mr. Speed (age 71) had a hereditary condition that required an aortic heart valve replacement surgery. In the four years that led up to his surgery, he “kept running despite the breathlessness even though it was quite uncomfortable” because he was determined to stay fit for running. Mr. Bill Oar (age 64) was forced to take a week off to recover from an injury because it was too painful to keep training. He explained how it was “real difficult for me because I wanted to [keep training.]” Sport may have been an influence for Mr. Bill Oar (age 64) in developing this resilience to keep going: “I’m just wondering if people who don’t play sports just don’t have that experience of falling and failing and getting back up.”

In summary, the participants experienced a lot of bad falls and injuries. They accepted them and immediately started to work on recovery rather than sitting back and giving up. They had a support system of healthcare professionals who they deeply trusted to help them overcome their health-related setbacks. It was also interesting to note that in spite of setbacks, none of the participants indicated the desire to quit their sport involvement in the future. These elements together depicted the theme of resilience. It did not appear to matter what adversity the masters athletes faced since they seemingly had the ability and mindset to bounce back and learn from their experiences.

#### 4.2.5 Self-Fulfillment

A final theme that was identified in the experiences of study participants was self-fulfillment. This theme emerged from the following codes and sub-codes: Extrinsic motivation, Goals and plans, Intrinsic motivation, Late-life history, Turning point, and Worldview. The participants’ motivations to compete in sport appeared to initially stem from trying to “stay fit” and healthy. However, as their interviews progressed, there was a shift in focus to more diverse reasons, such as the love of competition and attempts to conquer challenges. These diverse motivations seemed to fit well under a theme of striving for self-fulfillment. In their pursuits of this feeling, participants accepted the risk of falls in sport and their resilient nature helped propel

them through difficulties in their way as they continued their journey towards self-fulfillment. In this way, this theme played a role in two of the themes (Acceptance and Resilience) described in previous sections.

Reaching their goals and the feeling of accomplishment seemed to exceed the perceived risk for falls in sport. In this sense, they accepted the risk as just another aspect of sport in the hopes of satisfying their motivations and goals. Mr. Pentathlon (age 81) talked about his enjoyment of the feelings he got in high pressure situations: “the more that is in play, the greater the feeling when you cross the line. Then there’s this utopia . . . like the more pressure there, the more feedback at the other end.” Ironman Grandma (age 66) explained that she was “very goal-oriented. I have to have goals.” So in preparation for an Ironman competition, she planned races starting with shorter distances as steps along the path to her big competition goal. Mr. Speed (age 71) explained how he always set high goals for himself because of the great feeling he got if he reached it. He believed that sport was a great way to do this:

When I do something, I like to do things well, so I always set the bar high and I enjoy trying to achieve the highest I can at whatever I do and running is a good aspect of that. You can set the bar high and try and aim for it. Very rarely achieve it but when you do achieve it, it’s such a great feeling!

Many of the participants explained that one of the main reasons they continued to compete in sport was their love for mastering challenges. Mr. Sunny’s (age 80) main goal for each race was to master a challenge, while beating the rest of his competitors came secondary:

With my last race I had a personal best and I was first in my age category, so that has become something of a challenge for me and something that I strive to achieve with each race that I compete in. Being first in my age category is . . . somewhat important but is not my . . . main objective. My main objective is to have a personal best.

Mr. Bill Oar (age 64) said that “in the sculling [rowing] . . . it’s complicated . . . it’s all balance and it’s all technique, so I enjoy conquering those things, developing those skills, and conquering them and then doing them at speed.” He went on to explain that falling was one of the aspects of sport that he wanted to conquer: “it’s the fact that there’s things to learn and there’s things to conquer and of course, one of those things is falling.” Mr. Decathlon (age 60) was also motivated

by the physical and mental challenges of sport: “and that’s why I do the decathlon because it’s . . . two days of hell and you’re pushing yourself completely and after nine events, you run the 1500 meters and that’s a mental challenge.”

One of the goals and challenges mentioned was the desire to win. Mr. Racquet (age 84) described this idea nicely when he said: “if you’re in the court and you’re playing a game . . . you are competing ‘cuz everybody wants to win and you are there to do your very best to win.” However, even if they were not winning or reaching their goals, some of the participants explained that they were motivated by “just being there, just . . . competing” (Mr. Dual Sport; age 59). Mr. Racquet (age 84) followed up his statement about wanting to win by saying that “if you have to lose, you lose to a good opponent, you feel satisfied. You’ve done your very best right? And you respect the person or the team that’s better than you are.” Ironman Grandma (age 66) ran each Ironman race with her son. She described her favourite aspect of Ironman competitions and the motivation that kept her going through each race:

It’s the coolest thing . . . to be out there with 2500 athletes and on the run, my son is fast . . . and he’s on the last loop heading home on the run and I’m just starting out on the run and I’ve got seven hours of running yet to go and he comes across to my side of the path and . . . just stops and hugs me and says, ‘Mom, I’m so proud of you’ . . . and so that has been one of our . . . things that we have done over the course of our Ironman together.

Being competitive and enjoying the competitive nature of sport was another central motivation. Mr. Rusty (age 67) explained that when it came to sport, he was competitive: “It’s competition really. I mean I’m not really a competitive person otherwise but I’m a competitive person when it comes to competing on the track. I like that!” Mr. Bill Oar (age 64), who was involved in competitive sport in his youth but took a break through his working life, was surprised that when he competed as an older adult it was “still competitive, it’s still exciting, but the thrill is the fact that I still can do it, I still am competitive. I don’t need to place, I just need to do better each time I got out and compete.” Ms. Backstroke (age 58) explained that one of her goals in sport was qualifying for the “World Masters Swimming” competition each year because she did “like to compete . . . to see where I am at the end of the day.”

The social influence of sport was another main motivator for these participants. They spoke about how much they enjoyed being with friends, teammates, and even competitors. For

Ms. Doc Swim (68 years old), she loved the friendships she gained by being on a masters swim team: “meeting different people too . . . through the team and through swim meets. I’ve got friends across [country] now because I see them at Nationals and so you connect and . . . that’s another nice side of it.” Mr. Pentathlon (age 81) explained the significance to him of companionship in sport:

You’re enjoying an activity with . . . somebody else who has the same interests . . . I travel with . . . one chap primarily . . . and we’ll go to [city] . . . for a meet and the subject never changes from the time we leave home ‘till we get to [next city] . . . and we just go on and on and on and on and the trip’s over.

Ms. Stanford was also motivated by the social connectedness she gained through her masters swimming involvement:

There is a great deal of camaraderie, like all our close friends are . . . friends on the team. We have pub night once a month, we have social functions, and that . . . is very important. . . . because it’s a solitary sport, it would be very hard to keep motivated for any length of time without being part of a team.

It seemed that when the participants felt good while competing in sport, they felt a strong desire to continue. When something took them away from sport, they were resilient to get back to that good feeling. For Mr. Racquet (age 84), the respect that he received from younger players was rewarding and made him very happy: “I’ve had players, two so far, who would run under the net and come over to me and shake my hands because of . . . something that helps them and they appreciate it very much (laughs) and that is very rewarding!” Ms. Backstroke (age 58) believed that sport and spirit went hand-in-hand. She explained that she felt good when competing outdoors with beautiful scenery surrounding her: “it warms your heart and you can swim outside, you know what I mean? It’s so cool . . . I think there’s a big connection there. It buoys your spirit, it buoys your heart . . . and you’re active and it feels good. It’s all about feeling good.” Mr. Rusty (age 67) took a lot of pride in competing as a masters athlete: “you may look out there and say, ‘look at those old fools out there.’ But I don’t! I mean . . . we’re athletes and we’re doing an athletic event that we take pride in.” He then continued by explaining that “I don’t need to run some novelty run in a quilt or something to feel good. This stuff [referring to track and field competition] makes me feel good.” Likewise, Mr. Speed (age 71) thoroughly enjoyed the fact

that he was moving fast because of the effort that *he* put forth. He said that he still competed because he loved “the thrill of speed . . . self-generated speed as opposed to someone who enjoys racing a motor car; same sort of feeling but a bigger feeling of fun because it’s self-generating.”

In summary, the participants’ motivations to compete in sport were diverse, but they all strove for self-fulfillment through sport. The participants appeared to thrive in the sport environment because it fueled new challenges and placed them alongside like-minded people. By nature, sport involvement provided constantly changing conditions, new competitors, new friends to meet, and different scenarios to overcome. This fostered an environment that was ripe with self-fulfillment endeavours.

### 4.3 Aggregation of Findings Interpretations

The theme of Acceptance of Fall-Risk was a starting point for all of the other core themes. In accepting the risks in sport, the masters athletes learned how to avoid the risk or embrace it by learning how to adjust when faced with adversity. For these masters athletes, the mindset was to push hard and try their best in order to achieve better results or feel good about their performance. In this way, acceptance of risk developed into a major theme.

The themes of Learning and Heightened Awareness were closely related. In order to have a *heightened* awareness, one must first learn. The participants learned through multiple avenues, such as research, experience with falls, and training, and in doing so, they seemed to become more aware of their bodies and their surroundings. In gaining heightened awareness, participants were more vigilant without sacrificing their ability to continue competing or training. However, there were times when heightened awareness did not prevent an injury or fall. This is where resilience came in. Despite countless setbacks and injuries encountered, participants’ resiliency kept them competing in sport or trying to work back to good health. Lastly, the masters athletes described a diverse range of motivations that were collectively interpreted as striving for self-fulfillment. In pursuit of this feeling, they accepted the risk for falls in sport and their resilient determination helped push them through difficulties as they continued their journey towards self-fulfillment.



## CHAPTER V

### DISCUSSION

This study was conducted to explore the fall-risk experience of masters athletes actively competing in sport. This chapter will begin by discussing the informant profiles by using Maslow's (1943) hierarchy of human needs. It will then locate findings from the study within Rowe and Kahn's (1997) model of successful aging and the meta-theory of selection, optimization, and compensation. Next, the study's findings will be discussed in relation to current literature on resiliency and motivation to compete in masters sport, as they were two of the study's most prominent emergent themes. Study limitations, study strengths, and implications for future research will then be presented. The chapter will conclude with implications for sedentary older adults by discussing the findings in the context of the lead researcher's experience as a falls prevention exercise instructor.

#### 5.1 Who were the Informants?

Although generalizability is not the aim of a phenomenology study, the findings from this study may help other older adults as they reflect on their own fall-risk experience. In order to do so, a deeper understanding of the study participants' motivations is needed. The informants for the current study shared exceptional characteristics that made them exceptional people in many ways. They were positive and resilient older adults who chose to spend their free time training and competing in sport. They were tenacious in achieving their goals and had a number of meaningful motivations that drove their development both in sport and in life. They were highly educated, for the most part, and likely affluent as a result of their professional lives. These shared characteristics can be explored through Maslow's (1943) hierarchy of human needs.

The hierarchical progression can help to elucidate motivations. Participants in the current study were not primarily concerned with finding shelter or satisfying hunger, so their physiological needs were not their primary motivators. The basic safety needs of participants appeared satisfied at the time of the interviews. For many of the falls described, participants were concerned for their safety and this need dominated their motivations. Once they recovered from injury and felt safe again, their safety needs were met. Participants were aware of risks; however, their acceptance of risk in sport provided evidence that their safety needs were not a primary

motivator when an injury was not present. The love and belonging needs were likely satisfied through a few different avenues. Most of the participants were married and 15 mentioned that they had children, so they were presumably loved by family. They described the camaraderie and friendships they gained through their sport involvement, indicating that the love and belonging needs of the participants were met. The fourth need, esteem, was well satisfied by all participants. Maslow (1943) explains that when this need is met, it “leads to feelings of self-confidence, worth, strength, capability, and adequacy of being useful and necessary in the world” (p. 382). The participants certainly displayed flairs of each of these aspects in their body language and their narratives about competing, winning medals, achieving a personal best time, and providing examples for younger generations.

The final need in Maslow’s hierarchy is self-actualization. Findings from the current study indicate that participants were striving for self-fulfillment. It was unclear or unknown whether any of the participants satisfied this final hierarchical need, but they certainly strove toward its achievement, and were motivated to do so. Maslow (1943) explained that when people are focused on a higher order need, they may temporarily deprive a lower level need. With this in mind, it makes sense that the participants, in focusing on the higher order need of striving for self-fulfillment through sport accepted the risk for falls, and thereby occasionally jeopardized their lower safety needs.

## 5.2 Masters Athletes as Successful Agers

Weir, Baker, and Horton (2010) suggested that masters athletes “represent some of society’s most successful agers, at least from a physical standpoint” (p.10). The active training and competition that masters athletes undergo surely gives this impression, but there are other elements of successful aging that masters athletes exhibit. In terms of the fall-risk experience, the participants seemed to be successful in dealing with fall injuries and the risk for falls. With this in mind, it may be possible to draw elements of successful aging from the findings to improve the health of other older adults. As a brief review, Rowe and Kahn (1997) define successful aging “as including three main components: low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life” (p. 433).

Baker, Meisner, Logan, Kungl, and Weir's (2009) study used the Canadian Community Health Survey (CCHS) to examine the relationship between physical activity and successful aging in 12,042 Canadian older adults. Physical activity levels were based on participant energy expenditure values. The disease and disability component of successful aging was assessed by asking participants about chronic conditions they currently had. The study found that regardless of age, sex, and income, being at least moderately active increased the chances of aging successfully. In the current study, many of the motivations to compete and train for sport stemmed from health purposes, so it is likely that the masters athletes believed that sport kept or made them healthy. The emphasis on objective physical measures (e.g., absence of disease) in the first component of Rowe and Kahn's (1997) definition does not necessarily depict how an older person views their own success in aging. Half of the participants in the current study (n=11) self-identified as having at least one chronic health condition so only the other 11 participants would be defined as successfully aging since they did not report any chronic conditions. Yet, they still felt healthy. With this in mind, it is possible that by being physically active, the masters athletes felt like successful agers in spite of reported chronic conditions.

For the second component, the masters athletes in this study had arguably high cognitive and physical functional capacity. Despite recognizing the role of exercise in preventing falls (Robertson & Gillespie, 2013), results from the 2007 to 2009 Canadian Health Measures Survey (CHMS) indicate that 68% of adult men and 69% of adult women were sedentary while only 5% of adults were moderate-to-vigorously active (Colley et al., 2011). Similarly, in Canada, sport participation among adults aged 55 years and older has declined from 25% to 17% from 1992 to 2010, respectively (Canadian Heritage, 2013). If physical activity has such a strong influence on aging successfully, then more Canadians might be interested in becoming active and following the examples of masters athletes.

The final component of Rowe and Kahn's (1997) definition of successful aging is an active engagement with life. This component is broken down into interpersonal relations and productive activity. Participants in this study described many meaningful interpersonal relations as they spoke about the camaraderie and social aspects of masters sport, where participants were friends with both competitors and teammates. Their strong social bonds were brought up as motivators that kept them active into late life. Weir (2010) also points out that this component

“has a huge potential to influence involvement in physical activity” (168). Since the focus of sport is on maximizing physical function, this social element deserves more attention for future promotion of successful aging. As for the productive activity subcomponent of active engagement with life, competing and training in sport would require a person to create “societal value, whether or not it is reimbursed” (Rowe & Kahn, 1997, p.434). The societal value of actively competing in masters sport can be acting as a role model for other people, both young and old, to take up healthy endeavors. The admiration that the participants expressed for very old competitors kept them inspired on a daily basis despite the risks they acknowledged in sport. Participants like Mr. Racquet (age 84), Mr. Sunny (age 80), and Mr. Pentathlon (age 81) acted as role models through sport and actively tried to inspire others to get active and show others what very old adults are capable of doing. This may not necessarily provide direct economic benefit to society, but it may improve physical activity of sedentary people, which in turn could create savings in health care systems.

### 5.3 Masters Athletes through the Prism of the Selection, Optimization, and Compensation Meta-theory

A strategy that the masters athletes used to help them become successful agers and stay motivated was the meta-theory of development called selection, optimization, and compensation (SOC). Baltes and Baltes (1990) explained that this meta-theory describes adaptation. SOC has been chosen over other theories of aging to make sense of the findings from this study because it “addresses improvement, maintenance, and reorientation in terms of coping with major life change and loss” (Donnellan & O’Neill, 2014, p.426). The masters athletes shared the three SOC elements at different points in the exploration of their fall-risk experience.

The meta-theory has typically been used to explain adaptations older adults make to minimize losses in biological, mental, and social reserves. Although this may be true for the majority of older adults entering the fourth age (typically over the age of 85), the masters athletes in the current study demonstrated individualized gains-based adaptations. Baltes and Smith (2004) explained that cultures providing opportunities to select, optimize, and compensate, help people to maximize their gains as they age. In masters sport, the age-grading system, whereby athletes compete in five-year age categories, is a form of accounting for the losses and performance decline associated with normal aging. In this way, the masters sport system

recognizes losses and accommodates for them. The sporting environment also offers opportunities for maximizing gains.

The masters athletes had diverse sets of goals and motivations that kept them resilient in their sporting pursuits. It was the focus on these motivations that helped the masters athletes overcome setbacks. This aligns with Donnellan and O’Neill’s (2014) explanation that the SOC process focuses more on finding a way to achieve goals than focusing on losses. Donnellan and O’Neill (2014) applied the SOC theory to stroke rehabilitation and found that it had the potential to facilitate the complex adjustments needed to recover from a stroke. Since SOC is goal-oriented, this was well suited to the goal-oriented approach of stroke rehabilitation. In the fall-risk experience, the masters athletes focused on their goals of competition and on their recovery from injury. They recognized that “this too shall pass” and focused on their goals rather than their losses (e.g., injury).

Mr. Sunny (age 80) will be used here as an example to explain the improvements, maintenance, and reorientations one can obtain through the use of selection, optimization, and compensation. Baltes (1997) explained that selection involves aiming for a goal or final product. Mr. Sunny took up long-distance running when he was 67 years old and ran, on average, twice a week to train for races. He focused on his goals of improving his personal best times, his running ability, and avoiding the decline into poor health (selection). Baltes (1997) further explained that optimization involves the resources used to achieve the chosen goals. Over time, Mr. Sunny added dynamic functional therapy to his weekly training that increased his endurance and strength, and helped effectively manage his osteoarthritis. His race times show that he ran faster as an 80-year-old than when he was 67 (optimization). Lastly, Baltes (1997) explained that compensation is the response to one’s losses in resources that are used to maintain success or reach desired outcomes. Mr. Sunny became somewhat of an expert in preventing what he referred to as the “inevitable,” referring to major functional decline. He stayed well hydrated, was on a strict diet, bought proper running shoes, researched proper running techniques, and properly treated his ailments by seeking help from professionals. He also focused more time, energy, and attention on his training (compensation). As a collective, the participants in the study were focused on their goals rather than the losses which helped them adapt to the risks involved in sport.

This reflection on masters athletes through the prism of the SOC meta-theory shows that it is possible to not only compete in sports as an older adult, but also to thrive. Focusing on goals and consciously applying the selection, optimization, and compensation framework offers a possible mechanism that older adults can use to overcome challenges and remain active into late life. This is encouraging for older adults who are considering sport participation, but have been hesitant due to various physical ailments and health challenges.

#### 5.4 Study Findings in Relation to Literature on Resiliency

Resiliency played a big role in the fall-risk experience of the masters athletes. It helped them accept the risk for falls. It was also a driving force that kept them determined to overcome challenges, which were found to be plentiful in sports represented in this study. Resnick (2014) explained the importance of adversity in the development of resilience. The participants in the current study actively sought challenges and faced adversity through sport, so in this light, their sport involvement can be seen as contributing to their development of resilience. When they fell or were faced with serious health issues or injuries, they never gave up. They had a firm determination to keep competing in sport and overcome challenges. This aligns with Resnick (2014) who said that determination and a willingness to overcome challenges were major aspects of resilience. Resnick (2014) also noted that resilient people continue to work towards their goals and focus on activities that they find meaning in. It is important to note here that resilience as a construct is not exclusive to sport but is also found in literature on aging (Baltes & Baltes, 1990). No matter what challenges a resilient person is faced with, they have hope that they will overcome setbacks. A resilient person's confidence and feeling of control over their life helps them remain positive and simply see barriers as something to overcome. This description of a resilient person parallels the stories that the participants in the current study shared, as they remained determined, positive, and in control when they faced setbacks.

Collins and MacNamara (2012) argued for training youth to be resilient through sport development because youth learn from the natural setbacks and failures of sport. If the exposure to challenges as a youth can build resiliency for the future, it may be that the “continuers” and “re-kindlers” in the current study developed resiliency through their involvement in youth sport. The two “late-starters” in this study-Mr. Sunny and Mrs. Dragon- were both very resilient yet

had no known exposure to sport as youth. This shows that resiliency may also be developed by overcoming other life challenges, such as serious illness in midlife.

Gender differences was an aspect of resilience explored by Hu, Zhang, and Wang (2015). The authors suggested that when faced with challenges women often have a weaker sense of mastery than men. From the current study, Mrs. Dragon was a breast cancer survivor who pushed through her cancer and was very confident that she could overcome any challenges she faced. Ironman Grandma was arguably one of the most resilient participants. She encountered multiple falls that resulted in serious fractures and injuries but was determined to keep moving. She stayed positive and made adjustments to her training regime and mindset in order to recover so that she could return to sport. Lastly, Ms. Throw was a woman who was in a life-threatening car accident, but did not let that stop her from eventually returning to sport. She had to re-learn many skills, including walking, but she remained determined and continued to overcome the challenges she faced. With these three women as examples, it seems that the women in the current study had a strong resiliency when facing adversities.

## 5.5 Study Findings in Relation to Literature on Motivations for Sport Involvement

The participants in this study described many motivations to compete in sport. Their motivations played a big role in acceptance of risks and overall involvement in sport. For these reasons, the study's findings will be explored here in relation to current literature on motivations for sport involvement. The participants' love for attempting to master challenges paralleled Dionigi, Baker, & Horton's (2011) results whereby "I like a challenge" was a notable theme. The authors described that this theme was mostly about how the participants liked to compare their performance to past performances and push the body to its limit. The desire for competition was a result also reported by Dionigi (2005) and Grant (2001). Dionigi (2005) described "competing to win" (p.6) and "a competitive spirit" (p.10) as the two major themes that related to competition. The participants in that study compared themselves to others and pushed their bodies in competition in order to do their best and/or win. The participants in the current study were also very driven by the competitive nature of sport and enjoyed pushing their bodies to improve their skills and perform better in competition. Likewise, Grant (2001) described "serious play" (p.790) as a component in the experience of playing sports. Participants in that study described the special feeling that winning gave them but that winning was not all that mattered.

For them, simply competing and proving to themselves that they could do what they set out to do was rewarding enough. These findings are similar to the current study as the participants often sought to win but were also satisfied by just being in a competitive environment and trying their best.

Where the current study differed in terms of motivation was that it explored how the motivations related to the participants' fall-risk experiences. Two relatable findings in the literature draw parallels to the current study. The first was found in Grant (2001) whereby the author briefly mentioned that some participants were concerned with their declining functional capacity. An interesting aspect of Grant's (2001) study was that all participants reported having some form of physical or psychological setback during their later adulthood but they described their subjective health as very good. The participants in that study made adjustments in order to keep competing in masters sport. They adjusted their physical functioning but interestingly, not their attitude to perform. They believed that sport would help keep them independent and in control of their health. With the same firm mindset, it can therefore be argued that the participants in that study also displayed resiliency in sport in order to remain in control of their lives. Of the 11 participants with chronic conditions in the current study, all but one rated their health as good or excellent. Knowing that participants in the current study fell, and were often seriously injured or lived with chronic conditions, the argument can be raised that the benefits they perceived as receiving from sport led them to feel subjectively healthy. They described how training, competing, and being with like-minded people made them feel good. This is an important part of what sport brings to the lives of older adults: *feeling* good.

Another relatable finding in the literature was provided by Brymer's (2011) study that explored the lived experience of 15 extreme sport participants (30-72 years of age). These participants were specifically chosen because they participated in sports where the potential outcome of a mistake was an accident or even death. The author found that participants maintained a strong sense of control and prepared extensively for their sport activities to the point where participants believed socially accepted activities like driving or crossing the road were more risky than their sport. They also did not attempt to push themselves beyond their limits. The participants in that study were well aware of the huge risks involved in their sport but extensively learned about their sport, specific conditions, and their own bodily capacities in order



to minimize the risks. Many findings from the current study parallel those of Brymer (2011). First, participants in both studies were aware of and accepted the risks inherent in their sport. Second, preparation, seen through extensive training, and learning to be more aware of the environment and their bodies were viewed as protective against the risk of falling and/or getting injured. Lastly, participants in both studies attempted to stay within their physical and mental limits to reduce the risk of injury. Whatever the motivations were, they seemed to be important enough for these athletes to continue competing in the presence of risk.

## 5.6 Study Limitations

The current study had several limitations. First, the majority of the participants (91%) were married, which made the findings less generalizable and relatable to older adults who were divorced, widowed, or single. Second, 82% of the participants completed college or university, which made the sample highly educated. Being a highly educated group meant that they may have been more informed of the benefits, risks, uses of technology, prevention strategies of falls in sport, and likely had better means for travelling or affording the costs of sport participation. It is unknown what the experience would have been in other demographic and socio-economic groups. Also, 68% of the 22 participants were male (n=15), so the findings reflected predominantly a male perspective. Lastly, the information about the annual income of each participant was not collected. This became an important limitation as each participant's experience was influenced by availability of resources. For example, a masters athlete with high annual income would likely have better access to healthcare services not paid for by provincial insurance (i.e., physiotherapy, massage therapy, chiropractic, and dynamic functional therapy). Hence, such an athlete may have taken more risks in sport since they knew they could deal with the consequences of injury if encountered. Also related to availability of resources is the high cost of participation in sports. Sporting equipment costs money, whether it be running shoes or full hockey gear. Joining leagues, clubs, or attending competitions and travelling to such endeavors also cost a lot of money. Knowing annual incomes of participants in this study would be helpful.

## 5.7 Study Strengths

This study's recruitment strategy was largely successful. The study generated a lot of interest from masters athletes willing to share their falls-risk experiences. Contributing to this interest was the buy-in from the sport clubs, events, and competition organizers that were contacted. Another strength was the diverse range of sports included in the study (n=19). The range of participation levels from recreation to elite athletes was an added strength. Both of these provided a number of contexts from which interpretations of experience were drawn.

## 5.8 Establishing Trustworthiness

In order to ensure high quality of qualitative studies, Tracy (2010) suggested eight criteria for researchers to utilize when designing a study. These criteria are similar to reliability and validity measures in quantitative research. They are meant to “provide a parsimonious pedagogical tool . . . and encourage dialogue and learning amongst qualitative methodologists from various paradigms” (Tracy, 2010, p. 839). For the purposes of explaining how quality was assured in the current study, all eight of these criteria will be described in detail: 1) Rich rigor, 2) Sincerity, 3) Meaningful Coherence, 4) Worthy Topic, 5) Credibility, 6) Resonance, 7) Significant Contribution, and 8) Ethical.

**Rich Rigor.** Tracy (2010) explained that a high-quality study has plenty of complex data that is made rich through a variety of sources and participant contexts. In the current study, richness was generated by gathering data from 22 participants across 19 different sports. It was also generated by utilizing semi-structured one-on-one interviews with open-ended questions. Both the first and final question provided further creative data sources. Richness in quality can also be achieved through data collection and analysis methods. The lead researcher gathered participants from sports where falling was a regular occurrence (e.g., hockey) in combination with sports where falling was less regular (e.g., swimming) to capture a fuller spectrum of contexts for the fall-risk experience. Lastly, rigorous data analysis began with the verbatim transcription of the interviews and double-checking the transcripts with the matching audio files. The data analysis process was made transparent through the step-by-step explanation of how the data led to the emergent themes, which is consistent with Tracy's (2010) description of rigorous analysis.

**Sincerity.** Two aspects of sincerity that Tracy (2010) described were self-reflexivity and transparency. Self-reflexivity was practiced through the use of field notes. These notes included self-reflection, weekly de-briefing meetings with supervisor, and minutes from advisory committee meetings. Entries also included pre- and post-interview reflections and memos made while analyzing the data. These field notes were used by the lead researcher to remain open to his biases, adjust his interviewing style to minimize his biases, and track his thoughts. These elements were consistent with self-reflective practices. Sincerity was also achieved by remaining transparent about the study process. This is where the details of the study were clearly documented with explanations or references to support decisions. Step-by-step descriptions of how data was first collected, and how the themes emerged from this raw data are provided in the Methods section. By clearly documenting these steps, it leaves the study open to replicability and feedback, which are both aspects of a sincere study.

**Meaningful Coherence.** A meaningfully coherent study answers what it sought out to do. The current study's research question was grounded in the literature. The data collection and analysis were appropriate and the findings and conclusions were meaningfully connected to the literature. A final aspect of the study that was meaningfully coherent was the use of member checking, which allowed the participants to check their transcripts for accuracy and provide additional comments.

**Worthy Topic.** Tracy (2010) explained that "good qualitative research is relevant, timely, significant, interesting, or evocative" (p. 840). The literature review provided convincing evidence for the topic's worth and relevance. The large baby boom cohort is now entering late life and one in every three community-dwelling older adults are expected to fall each year. With injury and other negative impacts, falls cost the Canadian healthcare system nearly \$2 billion in direct healthcare costs. Strategies to maintain good health need to be explored. For these reasons, exploration of masters athlete fall-risk experiences is both timely and relevant.

**Credibility.** Credibility can be achieved through practices like thick description, multivocality, and member reflections. The current study used thick description by showing the complexity of the findings and allowing the reader to come to their own conclusions, while also providing the lead researcher's interpretations. Multivocality was achieved by providing contexts and

quotations from every participant. It was also attained by remaining sensitive to counter examples and viewpoints from the participants.

**Resonance.** For a study to be resonant, it must affect the reader. One way resonance can be achieved is by presenting the research in an evocative manner. Although resonance can only be assessed by the reader, the lead researcher attempted to satisfy this criterion by presenting the findings in the form of a story told through the participants' words. This was done to promote another aspect of resonance: transferability of the findings. Here, readers will be more likely to relate the findings to their own situations and actions based on the way the research is presented.

**Significant Contribution.** This criterion can be achieved by asking whether the knowledge gained is useful to society or develop curiosity for future research. The current study offered a number of future directions for research. It also provided implications for sedentary older adults, potential improvements of falls prevention exercise programs, and will hopefully inspire readers to explore their own fall-risk experiences.

**Ethical.** The current study was approved by Western University's Research Ethics Board and the lead researcher acted in an ethical manner for the study's entirety. The study's letter of information was clearly explained before participants provided written consent. All personal identifiers were removed from transcripts and all personal data collected through the consent form, demographic questionnaire, and contact information was stored in a locked desk in a locked research office. In terms of situational ethics considerations for the interviews, the lead researcher ensured all interviews were one-on-one. Self-reflection by the lead researcher kept him ethically honest about the interviews and study process.

## 5.9 Implications for Further Research

Competing in masters sport parallels the main recommendations for falls prevention exercise programs (Barnett et al., 2003), whereby sport can improve balance (Lamoth & van Heuvelen, 2012), leg strength (Marks, 2006), gait mechanics, and retain muscle mass (Wroblewski et al., 2011). Yet, masters athletes still fall and get injured, as explained by participants in the current study. However, falls prevention does not appear to be the goal of competing in sport. Rather, the goals of masters athletes are more diverse and related to self-fulfillment in life. In pursuit of their personal goals, the participants arguably exposed themselves to greater risk than participants in a

falls prevention exercise class within a controlled environment. However, some participants, like Ms. Love, explained that they “never fall.” This brings up the question: “Is there a sufficient amount of exposure to risk through sport or an optimal level of sport involvement that will allow a person to gain all the fitness benefits but not fall?” If an ideal exposure can be found that minimizes the risk of falling to basically zero and people learn how to stay in this ideal zone, there is the potential that more people will become involved and continue to compete in sport.

Similarly, another potential avenue for research is a comparison of fall rates of masters athletes with fall rates of people who attend falls prevention exercise classes. With research already available on the benefits of sport to physical fitness, it would be interesting to see if the improved fitness levels of masters athletes translates to a reduction in falls. It would also be interesting to answer the following questions: “Is there a difference in injurious fall rates between masters athletes and falls prevention exercise clients? Is there a difference in recovery time and medical costs following a fall-related injury?”

The current study did not set out to determine the mechanism of resilience. However, through the lived experiences of masters athlete participants, a few questions were raised that echo other researchers’ beckoning for further research on resilience development (Hu et al., 2014; Collins and MacNamara, 2012). For the “re-kindler” participants, was it their involvement in youth sport that made them resilient in masters sport or was it the challenges they faced in mid-life where sport participation was absent? Can sport be an effective intervention to develop resilience in late life? Can a sport intervention be implemented effectively at any life stage? Further research exploring these questions may be useful in uncovering the mechanism of how resilience develops. This would also have implications on physical activity recommendations in early life. If this mechanism can be identified, it may be possible to train resilience throughout the life course and help people remain independent and more active into late life which would lead to a healthier society.

A finding from the current study was that some of the participants learned to fall through their youth sport involvement and they applied the same techniques as an older adult. This brings up the question of whether or not there is a link between youth exposure to falls and injury prevention and experiences of injurious falls in late life. Is it possible that the methods of falling

that people learn in their youth are remembered and used when falling as an adult? Knowing this could help develop better long-term falls prevention interventions.

## 5.10 Implications for Sedentary Older Adults

This section brings the study back to the beginning and the question that triggered this inquiry: What can we learn from masters athletes that might help inform falls prevention programs for sedentary older adults? Potential implications of study findings are discussed in the context of the lead researcher's experience as a falls prevention exercise instructor. Hence, this section will be presented as a reflection, in a first-person format followed by a summary of organizations and groups that might benefit from the findings of this study.

In the second year of my MSc studies, I worked for the Victorian Order of Nurses (VON) as a group fitness instructor for the SMART (Seniors Maintaining Active Roles Together) program. The program provides free fitness classes to adults 55 years of age and over living in the community and retirement homes in the London-Middlesex region of Ontario, Canada. As of April 2015, there were over 100 classes offered in this region. Each class consists of seven parts: aerobic warm-up, aerobic endurance, aerobic cool-down, strength training, flexibility training, balance training, and falls prevention education. I taught ten exercise classes each week at various retirement residences and community centres. The class sizes ranged from one person to 30 people. Participants' ages were unknown, but numerous clients told me they were in their 90's. As a falls prevention fitness instructor simultaneously researching for a thesis on falls, I had a unique opportunity to contemplate on how my research findings could benefit older adults.

After learning from the masters athletes and knowing that falls prevention through exercise has been shown to reduce falls and injurious falls (Campbell et al., 1999), I thought about how the falls prevention classes that I taught could be improved to get or keep more people active. First, the older adults who came regularly, or even sporadically, to the classes would not necessarily be labelled as "fit." Yet, they were much more physically capable than some of the sedentary older adults that I passed by in the halls of retirement homes. So it became clear to me that there was something missing in our ability to draw older adults to exercise classes and keep them coming regularly. As the study's themes emerged, I realized that this missing aspect was inspiring older adults to strive for self-fulfillment. If they actively strove for this through

exercise, they could likely develop resilience and become more confident in their abilities to perform activities of daily living. For someone like Edward, whose fictional case study was presented in the introduction, promoting self-fulfillment may help him take up exercise again and continue despite occasional setbacks.

Second, the goals of the adults attending my classes, if they had any, were largely unknown to me. As the instructor I decided what specific exercises to do each day. Knowing my clients' goals, or helping them develop meaningful goals, would be a beneficial aspect to the classes that I think would give them more reason to attend class regularly. This, in turn, could potentially make them stronger and able to avoid the negative consequences of losses of balance. Taking into consideration peoples' motivations and goals and accomplishing them through each exercise class may help improve their feelings of well-being. Learning in a controlled environment with a trained exercise instructor is an ideal scenario for improving confidence. Therefore, incorporating exercises that people are motivated to do could enable them to be more confident in day-to-day activities. This could then translate to greater independence and activity levels outside of the exercise class.

Third, comprehensive assessments have been recommended in research as a necessary first step for fall prevention (Barnett et al., 2012). For older adults interested in competing in sport for the first time, or even for those currently involved, having a comprehensive assessment done by a physician or another regulated healthcare professional may be beneficial in preventing falls. For someone like Sheila, whose fictional case study was also described in the introduction, this assessment might have helped her become more aware of falls. Identifying and mitigating risk factors before exposure to sport holds the potential to make participation in sport safer.

Fourth, study results indicate that when people focus on the gains, rather than the potential risks, they can achieve exceptional things. More people might be willing to accept the risk for falls and compete in sport armed with the skills and knowledge to protect them. Fifth, if I was given an opportunity to share findings of my study with sedentary older adults I would tell them: "You can use adverse events as learning opportunities to prevent the next one, just as the masters athletes did. When you compete in sport, you surround yourself with like-minded people who will support you through both good times and not-so-good times. Also, no one knows your body better than you so when you get involved, listen to your body and constantly adjust to

reduce your risk of falling. Pay attention to what your body is telling you, push yourself to find your limits, then respect them. Also pay attention to your surroundings and become more aware of potential risks before you approach them. Try to see challenges as something to overcome, then find a way to conquer them. Set meaningful goals for yourself and push yourself with relentless determination to reach those goals. The ultimate reward is self-fulfillment and feeling good about yourself.”

The following is a number of ideas of who might benefit most from the findings of this study. Re-kindlers may draw from the findings and explore their own fall-risk experiences to find strategies to actively re-engage and remain competing in sport. The same argument is true for continuers and late-starters. Retired older adults, who have more time and resources, may consider sport as a new hobby by first examining sport’s risks and rewards. Parents should become aware of how early exposure to sport can positively influence the lives of their children as they age. Getting children involved in sport early in life has potential to lay down a strong foundation that will foster resilient and motivated older adults. Sport clubs and organizations can learn from the findings and develop new promotional strategies to motivate more older adults to compete in sport into late life. Volunteer and paid leaders of older adult exercise programs at churches and community centres can learn how to heighten fall prevention awareness. Medical professionals, such as physiotherapists, chiropractors, massage therapists, and doctors, can become more aware of the important role they play in keeping masters athletes in top physical shape for sport. People and organizations that work with older adults, such as the Canadian Centre for Activity and Aging, may find this study helpful to better understand how they can use sport to promote awareness and self-fulfillment opportunities while also developing resilience in their clients. Lastly, the Canadian Society for Exercise Physiology could use the findings to enhance the Canadian Physical Activity Guidelines for older adults 65 years and older by adding how sport can be self-fulfilling while also offering the health benefits that are currently included in the guidelines.

## Conclusion

This study explored the fall-risk experience of masters athletes actively competing in sport. One-on-one semi-structured interviews were used to interview 22 masters athletes from 19 different sports. A hermeneutic phenomenology approach consistent with Max van Manen (1990) was



used. Data was analyzed through an interpretive-constructive paradigmatic framework. Personal reflection was used and recorded in a journal throughout the study in order for the lead researcher to remain open to his biases.

This study found that the masters athletes accepted the risk for falls and injuries due to falls in sport in their pursuits for self-fulfillment. Continuous learning played a significant role in their lived experiences. They actively learned how to mitigate their risk for falls, adjust to circumstances, and optimize the performance of their bodies. When they fell or saw others fall, they drew lessons from those events which led to a heightened awareness of their bodies and surroundings. The masters athletes were very resilient when faced with difficulties and had a “keep moving” mindset that helped them overcome setbacks. The participants had a diverse range of motivations to compete in sport that could collectively be interpreted as striving for self-fulfillment. In this pursuit, they accepted risks, including the risk for falls, and their resiliency propelled them through difficulties experienced on that journey. Falls and injuries did not deter them from getting back to the sport they loved. They were a highly motivated group and the hope is that the sharing of their experiences will inspire others to get involved in sport as a rewarding means of having fun while staying active and independent.

Knowing these findings, the question then becomes: “what should we do?” More work needs to be done to identify barriers to participation, then determine how these barriers can be removed or surmounted to promote physical activity. In research, more work needs to be done to determine whether or not there is an optimal sport involvement level that promotes fall prevention without over exposing an individual to increased risk of falls. Also, the development of resiliency needs further exploration to determine how it can be taught to promote independence into late life. At the most basic level, there should be a constant encouragement for more older adults to take up physical activity. For people already involved in sport, further encouragement and support could help keep them motivated to continue competing and striving to surpass their goals. Baby boomers want to live longer, remain independent, do more, and live enriching lives. Now is the time to capitalize on the benefits of sport involvement and live life to its full potential.

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# APPENDICES

## Appendix A: Ethics Approval Form



**Western  
Research**

Research Ethics

Western University Health Science Research Ethics Board  
HSREB Delegated Initial Approval Notice

**Principal Investigator:** Dr. Aleksandra Zecevic  
**Department & Institution:** Health Sciences/Faculty of Health Sciences, Western University

**HSREB File Number:** 105278  
**Study Title:** Exploring the fall-risk experience of masters athletes actively competing in sport  
**Sponsor:**

**HSREB Initial Approval Date:** June 17, 2014  
**HSREB Expiry Date:** August 31, 2019

**Documents Approved and/or Received for Information:**

Document Name	Comments	Version Date
Sponsor Protocol	Interview Guide	
Other	Cue Card for participant information; member checking purposes.	
Recruitment Items		
Other	Demographic Questionnaire	
Other	Email template for participant recruitment	
Response to Board Recommendations		2014/06/03
Revised Western University Protocol		2014/06/03
Revised Letter of Information & Consent		2014/06/03

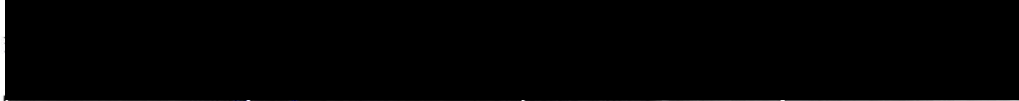
The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review. If an Updated Approval Notice is required prior to the HSREB Expiry Date, the Principal Investigator is responsible for completing and submitting an HSREB Updated Approval Form in a timely fashion.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.



<input type="checkbox"/> Erika Basile ebasile@uwo.ca	<input checked="" type="checkbox"/> Grace Kelly grace.kelly@uwo.ca	<input type="checkbox"/> Mina Mekhail mmekhail@uwo.ca	<input type="checkbox"/> Vikki Tran vikki.tran@uwo.ca
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*This is an official document. Please retain the original in your files.*

Western University, Research, Support Services Bldg., Rm. 5150  
London, ON, Canada N6A 3K7 t. 519.661.3036 f. 519.850.2466 www.uwo.ca/research/services/ethics

## Appendix B: Email Template for Recruitment of Potential Study Participants

Dear Madam/Sir,

My name is Dylan Brennan and I am a Graduate student at Western University. I am currently in my first year of studies in Health and Rehabilitation Sciences. For my Master's thesis, I am exploring the fall-risk experience of masters athletes who are actively competing in sport. For this study, a masters athlete is defined as any individual who is over the age of 55 and actively competes in athletic competitions at any level (recreational, competitive, or elite).

This (*add month*) I am interviewing masters athletes to explore the fall-risk experience. If you are over the age of 55, are actively competing in a sport, have not been diagnosed with memory loss, and can converse in English, you are eligible to take part in this study. Sound like something you would like to participate in? Please contact me. All information will be kept private and confidential.

If you have any additional questions, please contact the principal investigator, Dr. Aleksandra Zecevic.

I look forward to hearing from you,

Sincerely,

Dylan Brennan

MSc Candidate  
Graduate Program in HRS  
Western University

*\*\*\* If person emails me back with questions, I will respond to them appropriately. \*\*\**

*\*\*\* If person is interested in participating in this study, I will email them back with a thank you and move forward by planning the first interview at a time and location convenient to them. \*\*\**



---

# MASTERING FALLS

## Invitation to Participate in Research

Researchers from Western University are conducting a research project to investigate the fall-risk experience of masters athletes. If you are over 55 years of age and actively competing in athletic competitions at any level, you are an ideal candidate! Results from this study have the potential to inspire other older adults to become active!

## PARTICIPANTS WANTED!

---

**Male and Female  
adults over 55 years  
of age, competing in  
any sport**

---

**45-minute one-on-  
one interview at a  
location convenient  
to you!**

---

**INTERESTED?**  
Please contact Dylan

---

(Location, i.e. Booth)

RESEARCHER:

**Dylan Brennan**



Principal Investigator: Dr. Aleksandra  
Zecevic



## **Exploring the Fall-Risk Experience of Masters Athletes**

**Principal Investigator:** Aleksandra Zecevic, PhD, School of Health Studies, Western University, Faculty of Health Sciences

**Co-investigator:** Dylan Brennan, MSc candidate, Health and Rehabilitation Sciences Graduate Program, Western University

### **Letter of Information**

Dear \_\_\_\_\_

You are being invited to participate in a research project that will explore the fall-risk experiences of masters athletes who are actively competing in sport. For this study, a masters athlete is defined as any individual who is over the age of 55 and actively competes in athletic competitions at any level (recreational, competitive, or elite). To take part in this study you need to be 55 years of age or older, be actively competing in sport, not be diagnosed with memory loss, and be able to speak English. The purpose of this letter is to provide you with enough information to help you make an informed decision of whether or not to participate in this research study. If you agree, you will participate in an interview lasting about 45 minutes. The information you provide will be audio recorded, reviewed, transcribed, and analyzed. All personal identifiers, such as your name, will be replaced with a unique alias. The researcher will take every precaution to maintain confidentiality during and after the interview. All data will be kept confidential and locked at a secure location at the Western University for up to seven years. You do not waive any legal rights by signing the consent form.

You will not be compensated and you may not directly benefit from participating in this study. Information you provide will inform future physical activity campaigns and potentially inspire other older adults to become or remain physically active.

There are no known risks to your participation in this study. Participation is voluntary. You may refuse to participate, or refuse to answer any questions. If you wish to stop participation, please let the investigator know. The data collected prior to this point will be combined with other interviews and reported in study results.

If the results of the research are published or presented at scientific meetings, your name will not be used and no information that discloses your identity will be released without your explicit consent.

Representatives of The Western University Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research. If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Western University Office of Research Ethics. If you have any specific questions about the research project you may contact the principal investigator Dr. Aleksandra Zecevic.

This letter is for you to keep.

Sincerely,

Aleksandra Zecevic, PhD  
Faculty of Health Sciences  
Western University

## **Exploring the Fall-Risk Experience of Masters Athletes**

**Principal Investigator:** Aleksandra Zecevic, PhD, School of Health Studies, Western University, Faculty of Health Sciences.

**Co-investigator:** Dylan Brennan, MSc candidate, Health and Rehabilitation Sciences Graduate Program, Western University.

### **Consent Form**

I have read the Letter of Information and have had the nature of this study explained to me. All questions have been answered to my satisfaction. I am eligible to participate in this study. I allow my interview to be audio recorded.

---

Name of participant (Print)

---

Signature of participant

---

Date

---

Name of person obtaining consent (Print)

---

Signature of person obtaining consent

---

Date

Appendix E: Demographic Questionnaire

1. Gender:  
 Female     Male
2. Are you retired?  
 Yes     No
3. What is/was your occupation?  
\_\_\_\_\_
4. Education:  
 Grade 12 or less  
 High school diploma  
 College Degree  
 University Degree  
 Graduate/Professional School (e.g., PhD, MSc, Medicine, Dentistry, Law)  
 Other \_\_\_\_\_
5. Marital Status:  
 Single  
 Married  
 Divorced  
 Widow  
 Common-law
6. How would you rate your health?  
 Excellent     Good     Fair     Poor
7. Do you have any acute illnesses?  
 Yes     No  
If YES please list here:  
\_\_\_\_\_
8. Do you have any chronic conditions? (e.g., arthritis, high blood pressure)  
 Yes     No  
If YES please list here:  
\_\_\_\_\_
8. Are you currently taking any medications?  
 Yes     No  
If YES, please list here  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. How would you rate your vision?  
 Excellent     Good     Fair     Poor
10. How confident are you that you will not lose your balance or become unsteady while walking?  
 Very Confident  
 Confident  
 Somewhat Confident  
 Not at all confident
11. Falls history:  
 Fell only one time in the past year  
 Fell more than once in past year  
 Fall regularly (i.e., monthly)
12. Are you currently injured?  
 Yes     No
13. Have you been injured as the result of a fall in the past five years?  
 Yes     No
14. Have you ever been diagnosed with memory loss?  
 Yes     No
15. When did you begin competing at the masters level?  
 1-2 years ago  
 2-3 years ago  
 3-4 years ago  
 4-5 years ago  
 5+ years ago  
 10+ years ago  
Please specify:  
\_\_\_\_\_
16. In what sport(s) do you compete?  
\_\_\_\_\_
17. Which of the following terms do you identify with the most?  
 *Continuer* - I have been involved with sport since I was a youth  
 *Re-Kindler* - I was involved in sport at a young age, took a break in mid-life, and re-initiated my involvement in later life  
 *Late-starter* - I did not compete in sport until after the age of 50



## Appendix F: Semi-Structured Interview Guide

1. What sentence describes your experience as a master athlete?
2. Tell me about your involvement in masters [*sport*].
  - a. What do you enjoy the most about your sport?
3. How did you first get involved in sport?
  - a. Why? When?
  - b. What keeps you motivated?
4. How well do you know your body?
  - a. How do you adjust to your aging body (sarcopenia, vision, balance, chronic illness)?
  - b. How do you overcome setbacks (acute illness, injury)?
5. As an athlete you are exposed to a greater risk of falling. How do you manage this risk?  
What is your experience?
6. What one word would you use to describe your experience with falls?

## Appendix G: Coding List

### *Coding List*

	Code	Sub-code	Definition
1	Fear		Feelings and events that bring about fear.
2	Motivator	2.1 Intrinsic motivation	Behavior driven by internal rewards or individual feelings.
		2.2 Extrinsic motivation	Engaging in a behavior in order to earn external rewards or avoid punishments (focus is on self; not support of other people-SEE SUPPORT SYSTEM).
3	Setback	3.1 Social Setbacks	Challenges emerging from a person's social network that prevent them from competing in sport or doing what they normally do.
		3.2 Mental Setbacks	Challenges of a person's mind (i.e. thoughts) that prevent them from competing in sport or doing what they normally do.
		3.3 Physical Setbacks	Challenges of the physical body that prevent someone from competing in sport or doing what they normally do.
		3.4 Adaptations	Strategies used to overcome setbacks.
4	Training		Anything pertaining to the training an individual undergoes.
5	Goals and Plans		Something that a person strives to achieve and steps taken to do so.
6	Support System		Anyone or anything that supports the person in their sport experience (focus is on others, NOT self).
7	Worldview		How one see the world and how they live each day.

8	Falls	8.1 Fall experience	How the person describes their experience with falls.
		8.2 Prevention (of fall, of injury)	Strategies used to reduce falls and injury due to falls.
9	Awareness		Having knowledge or perception of a situation or fact.
10	Risk	10.1 Risk Experience	Exposure to danger, harm, or loss, or situations involving danger.
		10.2 Risk Management	How the person deals with risks (NOT related to falls).
11	History	11.1 Youth	The influences of one's youth.
		11.2 Mid-Life	Events that influenced the person's mid-life.
		11.3 Late Life	Events that influenced the person's late-life.
		11.4 Turning Point	Events influencing the person's shift to sport.
12	Other	12. 1 Feelings	Any emotional state or reaction.
		12. 2 Open	No code to fit this.

## Curriculum Vitae

### Dylan Brennan

#### Education

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MSc Candidate in Health and Rehabilitation Sciences; Health and Aging field, *Western University*, London, ON

BSc Specialized Honours, Kinesiology and Health Science, *York University*, North York, ON, 2012

#### Awards and Scholarships

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- Graduate Student Teaching Award at Western University 2014
- Undergraduate Residence Life Bursary 2010
- York University Entrance Scholarship 2008
- William J (Bill) Menton Award 2008

#### Research Interests and Experience

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- Health and Rehabilitation Sciences Graduate Research Conference 2015- Abstract Review Co-ordinator and member of planning committee [*February 2015*]
- Canadian Association on Gerontology's 43<sup>rd</sup> annual scientific and educational meeting 2014 Abstract Reviewer [*May 2014 and May 2015*]
- Vision and Falls in Hospitals: A Pilot Study- Graduate Research Assistant [*May 2014-November 2014*]
- Teaching Assistant for Gerontology in Practice undergraduate course [*September-December 2014 and 2015*]
- International Scientific Excellence Advisory Committee (ISEAC) Lay Reviewer for AllerGen's Request for Proposals (RFP) 2012-2016 [*June 2012*]

#### Graduate level presentations:

- Brennan, D., Zecevic, A., Sibbald, S., & Nolte, V. (2015). Exploring the fall-risk experience of masters athletes actively competing in sport. Gerontological Society of America 68<sup>th</sup> Annual Scientific Meeting, Nov. 18-22, 2015, Orlando, FL. (abstract submitted, poster)
- Zecevic, A., Brennan, D., Leat, S., Keeling, A., & Brymer, C. (2015). Falls in hospital patients: An overlooked contribution of vision. Gerontological Society of America 68<sup>th</sup> Annual Scientific Meeting, Nov. 18-22, 2015, Orlando, FL. (abstract submitted, presentation by Zecevic)
- Brennan, D., Zecevic, A., Sibbald, S., & Nolte, V. (2015). Exploring the fall-risk experience of masters athletes actively competing in sport. Canadian Association on Gerontology 43<sup>rd</sup> Annual Scientific and Educational Meeting, October 2014, Niagara Falls, ON. (abstract accepted, poster)
- Brennan, D., Zecevic, A., Sibbald, S., & Nolte, V. (2015). Exploring the fall-risk experience of masters athletes actively competing in sport. Health and Rehabilitation Sciences 8<sup>th</sup> Annual Graduate Research Conference, February 4, 2015, London, ON. (abstract accepted, presentation by Brennan)
- Brennan, D., Zecevic, A., Sibbald, S., & Nolte, V. (2014). Exploring the fall-risk experience of masters athletes actively competing in sport. Health and Rehabilitation Sciences 8<sup>th</sup> Annual Graduate Research Conference, February, 2014, London, ON. (abstract accepted, presentation by Brennan)

## **Volunteer Experience**

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- Anaphylaxis Canada- Youth Advisory Panel (YAP) – *WhyRiskIt?* Blog Editor [*May 2005-Present*]
- Society of Graduate Students (SOGS)- Council Member representing Health and Rehabilitation Sciences program [*May 2014-Present*]
- Health and Rehabilitation Sciences Graduate Student Council- Master of Science Representative [*May 2014-Present*]
- Dr. Anthony Scimè's Stem Cell Therapy Research Lab- Volunteer Assistant [*September 2012-August 2013*]

## **Professional Affiliations**

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- Canadian Association on Gerontology (CAG) [*April 2014-Present*]
- Certified Kinesiologist, Ontario Kinesiology Association (OKA) [*July 2012-December 2012*]

## **Skills and Qualifications**

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- Teaching Assistant Training Program completion
- Experience with NVivo 10© qualitative software
- Strong presentation skills
- Experience with qualitative data collection and analysis
- Literature review writing