The Impact of Character Strengths and Wellbeing on Sporting Injury

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Abstract

Positive psychology is a relatively new branch of psychology which focuses on helping individuals to flourish and function optimally. Because of the relatively recent advance of positive psychology, it has not been fully explored, and one area which may benefit from the application of positive psychology is the discipline of sport psychology. The goals of this research were to assess whether certain character strengths were associated with injury incidence and whether wellbeing predicted injury incidence. Further aims were to examine the character strength profile of recreational athletes, and compare this to normative data, and to measure injury incidence in amateur rugby, hockey and football players around a large urban area in New Zealand. A sample of athletes who play rugby, hockey and football were administered the VIA Character Strength Inventory, as well as completing the Work on Wellbeing survey. A self-report measure of injury was also included, which was completed by the athletes at the end of their sporting season. Results indicated that leadership and humour were significantly associated with the number of injuries sustained by athletes, whilst the self-rated health measure was associated with the number of sessions missed during the season, due to injury. Wellbeing was not related to any injury outcome. Across the sample, character strength scores were largely similar, with the chief difference observed being the ranking of bravery by rugby players which was higher than that of hockey or football players. There were also some differences noted in the ranking of strengths between this sample of athletes and a large, national sample from a larger study. This was unexpected given previous evidence which indicates that the ranking of character strengths should be largely ubiquitous. Finally, injury data in this study differed from similar, existing research findings, however reviews on the topic of injury incidence in sport reveal low concordance across data or method, and so differences between the data from this study and previous studies is not wholly unexpected. It is hypothesized that a relationship exists whereby athletes who score

highly in leadership also display high levels of motivation and commitment to their sport, which leads them to partake in risky behaviour on the sports field, resulting in higher injury incidence. These athletes are then more likely to form a negative cognitive appraisal surrounding this injury, which leads to negative recovery outcomes. A positive feedback loop could occur where athletes are more likely to sustain an injury, become injured, and then their history of injury, as well as personal and situational factors potentially predispose them to more injuries in the future. Future research may wish to consolidate upon the work of this study by further investigating the potential link between leadership and injury, as this could have widespread application in the sporting world, for both athletes and coaches seeking to reduce injuries and ameliorate injury risk.

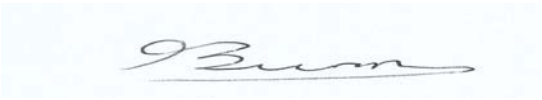
Table of Contents

List of Figures

List of Tables

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed: __  Date___19/05/2017_____

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Chapter 1. Introduction

Background

Positive Psychology is a relatively recent development within the field of psychology that focuses on the positive or beneficial aspects of an individual's psychological makeup that allows them to flourish or thrive (Seligman & Csikszentmihalyi, 2000). Recently, positive psychology has been used to provide a new perspective in areas like attachment, intrinsic motivation, optimism and emotional intelligence (Gable & Haidt, 2005). One branch of psychology that has seen little application of positive psychology to date is the discipline of sport psychology, the study of the psychological underpinnings of sports training and performance, and the application of this study in practise (Hanin & Stambulova, 2004; Weinberg & Gould, 2014). While little research currently integrates positive and sport psychology, they would, at face value, appear to have much to offer each other from both a theoretical and an applied perspective. Both disciplines seek to facilitate flourishing or optimal functioning (Gable and Haidt, 2005), whether it be in the personal or sporting domain. In both competitive and amateur sports, psychological preparation can be the difference between success and failure (Hanin & Stambulova, 2004). The process of ensuring optimal functioning and thriving in athletes, a fundamental component of athletic training, might therefore be advanced by the application of some concepts from positive psychology.

New Zealand could be characterised as a relatively active country, with a Sport New Zealand (2014) report revealing that 74% of adults (2.5 million people) had participated in sport or recreational activity in the previous week, and 78% indicating that they had participated in multiple sport or recreational activities in the previous year. Rugby union can be considered the national sport, dominating sports coverage in the media, and has been widely acknowledged as having cultural significance, especially for New Zealand males (Pringle,

2001). Rugby in New Zealand had 148,483 registered players in 2014 (World Rugby, 2014). Football is also played throughout the country, with Sport New Zealand (2014) reporting that 167,000 people had played football at some stage in the previous 12 months, which was more than rugby. Field hockey, referred to as hockey throughout this thesis, is another popular sport, with 45,581 registered hockey players in 2011 (Hockey New Zealand, 2012). These participants are largely amateur athletes who partake in sport recreationally, they do not receive financial compensation and take part in sport primarily for enjoyment.

Any participation in sport involves a risk of being injured. In 2015, the Accident Compensation Corporation (ACC) in New Zealand accepted 54,870 new claims for injuries sustained while playing or training for amateur rugby alone, at a cost of $73,544,887, whilst 33,348 football injuries cost $31,397,210, and hockey accounted for 5,614 injuries, at a cost of $3,669,075 (ACC New Zealand, 2017). Given the combined cost of over 110 million dollars of compensation for injury in 2015, it is important to understand trends in athletic injury, and any technique which could reduce injury rates in sport would be highly valuable.

The Present Study

The present study sought to investigate whether a relationship exists between positive psychology dimensions and a particular sporting phenomenon. Specifically, this study investigated whether character strengths, the slew of traits which can be said to make up the positive components of one's personality, and psychological wellbeing could be used to predict injury in amateur rugby, football or hockey players. There is some research evidence suggesting that certain psychological factors can be antecedents to athletic injury (Junge, 2000; Ivarsson & Johnson, 2010), however the dearth of literature applying positive psychology to sporting injury makes this study ideally placed to investigate an area which, to date, has not been extensively researched.

This study used a cross-sectional sample of male athletes competing in club level rugby, football and hockey. All three sports were invasion games, involving players seeking to enter the oppositions 'territory' and score goals or points, as well as all having an element of physical contact. To qualify for the study, athletes had to be amateurs (not receiving payment for their participation), and participate in their chosen sport only recreationally (not competing at representative level, and not in a premier team for their respective club). Participants still played competitively however, with no teams that listed themselves as 'social' included in the study, ensuring that while the athletes were amateurs, there was still a level of dedication to their sport. All three sports selected were winter sports, with the season for each running from May through to September, and participants were drawn from a large city in New Zealand. Whilst no data on demographics was formally collected, participants were largely Caucasian, with a mix of students and employed individuals. Information on character strengths and wellbeing measures were gathered using online surveys, and injury data were gathered from athletes through questionnaires in a self-report fashion. For the purpose of this study, injury was defined as "any trauma that happens while playing or training for your sport, which requires you to cease playing or training in that session and/or miss an ensuing training session or game", a description which is in congruence with those used in previous research (Bathgate, Best, Craig & Jamieson, 2001; Brooks, Fuller, Kemp & Reddin, 2005). Athletes were grouped into categories denoting the number of injuries they had sustained over the season (0 injuries, 1 injury, 2 or more injuries) so as to investigate differences in injury frequency. This data was then collected and analysed, to ascertain whether there were any relationships between the injury measures and psychological measures.

Benefits of this Research.

This study has the potential to advance knowledge in both the positive psychology and sport psychology fields. It will be the first study to profile the character strengths of

amateur athletes in New Zealand, and will add to the limited existing work assessing character strengths in athletes (Raimundi, Molina, Schmidt & Hernandez-Mendo, 2016). Park, Peterson and Seligman's (2006) study of a large sample from New Zealand observed that the top five most highly endorsed character strengths were curiosity, open-mindedness, fairness, love of learning and kindness. Using the full ranking of 24 strengths from Park et al.'s, (2006) sample, this research could indicate whether there are any differences between the general public and the recreational athlete sub-population in character strength ranking.

Furthermore, this research will be ideally placed to investigate whether there are different character strength profiles between those who gravitate towards rugby, football or hockey, as well as potentially informing future research which may seek to replicate this study in a professional athlete population, or use a larger sample. Wellbeing has been largely under-studied as an antecedent to injury and whether wellbeing is related to athletic injury will also be assessed. This study will also be able to examine whether certain character strength profiles, as well as individual character strengths, predispose athletes to injury, information which may be useful to coaches and athletes alike. Furthermore, there is little data regarding injury rates of amateur football and hockey players in New Zealand, and so this study may also provide preliminary descriptive statistics surrounding injury incidence among these athletes.

If a relationship between character strengths, wellbeing and sporting injuries can be identified, this information could be of significant value to coaches and athletes alike. Coaches could identify athletes more likely to sustain injuries, and tailor their training programs accordingly, whilst athletes might increase their chances of avoiding injury. Given that this study is only assessing amateur athletes, the general population stands to benefit from any findings which relate to the minimizing of injury risk, especially given the significant cost of injuries sustained by amateur athletes.

Chapter 2. Literature Review

Positive Psychology

Seligman and Csikszentmihalyi (2000) were among the first to formally define the field of positive psychology, in their seminal article “Positive Psychology: An Introduction”. This was the first journal article to elucidate the tenets of positive psychology as they are understood today, however it was not the first time that this topic had been discussed by psychologists. Humanistic approaches to psychology that prioritized happiness and wellbeing had been advanced in the past, with Maslow focusing on the fulfilment of innate, human needs which culminated in self-actualization (Maslow, 1943). Rogers also contributed to the humanistic movement with his ‘person-centered approach’ to psychology and psychotherapy (Rogers, 1959) which stressed that for an individual to ‘grow’ they needed an environment which provided them with genuineness, acceptance and empathy. Similarly, the notion of an existential form of psychotherapy put forward by Frankl (1959), which focused on finding meaning in people’s lives, contributed further to psychological theories about the individual. Csikszentmihalyi (2000) states that the lack of a “cumulative empirical base” (p. 7) prevented this humanistic theme from permeating further into psychology’s canon. In the late 1990s and early 2000s, a more clearly defined field of positive psychology began to emerge. In their aforementioned paper, Seligman and Csikszentmihalyi (2000) both relate short, personal stories that led to the development of their views regarding positive psychology and its importance. Seligman recounts that his daughter said to him one day that while she used to be a ‘whiner’, after she turned five, she decided not to whine any more, and if she could make that decision, he could decide to stop being a ‘grouch’. He states that he realised that raising his daughter was not necessarily about correcting her whining, for she had done that herself, but rather it was about nurturing her ability to identify her own problem (her whining) and correct it. Csikszentmihalyi tells the reader that during World War 2, he observed adults he

had previously known to be self-confident and successful became dispirited and helpless, and characterized them as “empty shells” (p. 6). However, in amongst the suffering he observed some individuals who kept their “integrity and purpose despite the surrounding chaos” (p. 6), and noted that the questions of where these people’s inner strength came from fascinated him. Both these authors link these experiences back to the general field of psychology. After World War 2, there were considerable numbers of veterans suffering from mental illnesses, such as Post-Traumatic Stress Disorder, and many psychologists were required to treat them. With the economic incentive generated by this large need (research grants and career prospects heavily favoured psychologists working in the mental health field), the focus of psychology became assessing and curing an individual’s suffering. Seligman and Csikszentmihalyi argue, however, that psychology is not just the study of pathology, and that nurturing what is best in someone can be just as effective as treating what is broken. This point, that nurturing what is good in someone should be just as important a part of treatment as fixing what is broken, is one of the main arguments that supports continued research in positive psychology (Sheldon & King, 2001). Thus, the field of positive psychology can be defined as the study of the mechanisms and processes that bring about flourishing or optimal functioning of people, groups, and organisations (Gable & Haidt, 2005; Ryff, 2003). Gable and Haidt (2005) have also stated that the aim of research in positive psychology should be to study the opposite to what those in the clinical field focus on (disorder and imbalance), such as how people feel joy, altruism and how happy families are created.

Seligman and Csikszentmihalyi (2000) group early research into three main topics: (i) the positive experience itself; (ii) the positive personality; and (iii) positive communities and institutions. The chief area of interest to the present research is the second of these broad domains, the positive personality.

Character Strengths

Character strengths may be thought of as those aspects of one's personality which are morally valued (Park & Peterson, 2009). An influential description of Character Strengths is outlined by Peterson and Seligman (2004) in their Values in Action Classification of Strengths (VIA). In this work, they define six 'virtues', core characteristics which are considered 'good' by a majority of cultures and moral philosophers. Each virtue is in turn made up of 24 measurable character strengths, the specific psychological processes or mechanisms which define the virtues. This multi-faceted approach is necessary since a person's character itself is not one dimensional, but is made up of different traits, unique to the individual. Furthermore, there is no one value or trait that is good, rather there is a family of traits, which, taken together, may be considered good, many of which can be distinctly different. In their handbook, Peterson and Seligman detail how they, with advice and input from other scholars, initially came up with a long list of several dozen strengths. These came from their own brainstorming and historical documents (Peterson & Seligman, 2004). They then applied 12 criteria to qualify an individual strength as suitable. These criteria are listed in Table 1, taken from Park, Peterson and Seligman (2004).

Table 1.

Criteria for a Character Strength

1. Ubiquity – is widely recognized across cultures.
2. Fulfilling – contributes broadly to individual fulfilment, satisfaction, and happiness
3. Morally Valued – is valued in its own right, not for tangible outcomes it may produce
4. Does Not Diminish Others – elevates others who witness it, produces admiration
5. Non-felicitous Opposite – has obvious antonyms that are 'negative'
6. Trait-like – is an individual difference with demonstrable generality and stability
7. Measurable – has been successfully measured by researchers as an individual difference
8. Distinctiveness – is not redundant with other character strengths
9. Paragons – is strikingly embodied in some individuals
10. Prodigies – is precociously shown by some children or youth
11. Selective absence – is missing altogether in some individuals
12. Institutions – is the deliberate target of societal practices and rituals that try to cultivate it

Using these criteria, Peterson and Seligman identified 24 character strengths, from an initial list of several dozen, and then classified these strengths into the aforementioned virtues. These virtues represent over-arching positive traits that have been demonstrated to be meaningful and present as desirable traits in different cultures and religions (Dahlsgaard, Peterson & Seligman, 2005). Table 2 shows the 6 virtues with their individual character strengths, as taken from Park and Peterson (2009).

Table 2.

VIA Classification of Strengths

Virtue	Character Strength	Description
Wisdom and Knowledge	Creativity	thinking of novel and productive ways to do things
	Curiosity	taking an interest in all of ongoing experience
	Open-Mindedness	thinking things through and examining them from all sides
	Love of Learning	mastering new skills, topics, and bodies of knowledge
	Perspective	being able to provide wise counsel to others
Courage	Honesty	speaking the truth and presenting oneself in a genuine way
	Bravery	*not* shrinking from threat, challenge, difficulty, or pain;
	Persistence	finishing what one starts
	Zest	approaching life with excitement and energy
Humanity	Kindness	doing favours and good deeds for others
	Love	valuing close relations with others
	Social Intelligence	being aware of the motives and feelings of self and others
Justice	Fairness	treating all people the same, according to notions of fairness and justice
	Leadership	organizing group activities and seeing that they happen
	Teamwork	working well as member of a group or team
Temperance	Forgiveness	forgiving those who have done wrong
	Modesty	letting one's accomplishments speak for themselves
	Prudence	being careful about one's choices; *not* saying or doing things that might later be regretted
	Self-Regulation	regulating what one feels and does
Transcendence	Appreciation of Beauty/Excellence	noticing and appreciating beauty, excellence, and/or skilled performance in all domains of life
	Gratitude	being aware of and thankful for the good things that happen
	Hope	expecting the best and working to achieve it
	Humour	liking to laugh and joke; bringing smiles to other people
	Religiousness	having coherent beliefs about the higher purpose and meaning of life

The VIA classification has gone on to be extensively used in studies around the world (Park, Peterson & Seligman, 2006), and considerable data is available to researchers regarding the makeup of different people's character strength profile. Research has indicated that citizens of the United States (US) tend to value kindness, fairness, honesty, gratitude and open-mindedness as the top 5 most commonly endorsed strengths, and prudence, modesty and self-regulation among the least endorsed (Park et al., 2006). This same study investigated 54 nations, indicating that rank order profiles (the order in which strengths were ranked by importance) between nations converged considerably, indicating that in general, kindness, love, honesty and fairness are ranked very highly regardless of culture. A closer look at the data from the work of Park and colleagues (2006) shows that New Zealand does differ from the US in terms of strengths ranking, with curiosity, open-mindedness, fairness, love of learning and kindness listed as the top five most endorsed strengths, whilst modesty, self-regulation and religiousness were the lowest three ranked Strengths. Of note, however, is that when weighted for various demographic factors, the Spearman ρ coefficient for the ranking of all 24 strengths was a statistically significant .84 between New Zealand and the United States. This supports the argument the authors put forward that certain character strengths are universally important, and suggests that these strengths form the basis of pervasive societal norms that are required for not just individuals to flourish, but society in general. Other research performed in the United Kingdom (UK) searched for gender differences in character strengths, observing that both men and women had ranked the same five strengths of highest importance, but in a slightly different order. Men placed, in order, open-mindedness, fairness, curiosity, love of learning and creativity, compared to women, who ranked fairness, kindness, open-mindedness, curiosity and love of learning as their top five character strengths (also in order). Kindness was ranked 7th by men (Linley et al., 2007). Other studies have involved

even more diverse groups, such as Kenyan Masai tribesmen and the Inuit people, and compared these to university students in Illinois (Biswas-Diener, 2006). All 24 character strengths appeared to resonate strongly with respondents from all three cultural groups, being highly rated as traits that were desirable in one's children.

Character strengths are generally stable, as indicated by Linley et al. (2007) who showed that Pearson correlations with age for all strengths were only weakly correlated, most being <.1, and the strongest correlation being for curiosity, which had a Pearson's correlation of .16 with age. Other research has investigated how character strengths can change following significant events, with evidence indicating that after the terrorist attacks of September 11th 2001, American citizens showed elevated levels of religiousness, hope and love, while no such increase was observed in European citizens (Peterson & Seligman, 2003). This supports the observations of Seligman and Csikszentmihalyi (2000) surrounding the dramatic and transformative impact the Second World War had on some individuals.

Of particular interest to psychology researchers are relationships between certain character strengths and life satisfaction, a component of general wellbeing. There is evidence to suggest that gratitude, zest, curiosity and love are consistently related to higher life satisfaction (Park & Peterson, 2006; Park, Peterson & Seligman, 2004). Research on college students has echoed this, indicating that among a large sample of students at a south-eastern university in the United States, zest, love, and hope were the top three predictors of general life satisfaction, with curiosity coming in fifth (Lounsbury, Fisher, Levy & Welsh, 2009). Further work by Peterson, Ruch, Beermann, Park and Seligman (2007) found that similar strengths (gratitude, zest, curiosity and love) were robust predictors of orientations towards happiness (engagement, pleasure and meaning), as well as life satisfaction. Interestingly, these authors did note some international differences, namely that gratitude was the most robust predictor in the US sample, whereas perseverance was the highest ranked strength in

the Swiss sample. This would seem to indicate that while in terms of ranking, there does not appear to be much difference between cultures, Peterson et al.'s (2007) work suggests that there may indeed be cultural differences surrounding the products or outcomes (such as orientations towards happiness) of certain character strengths.

Wellbeing.

The study of human wellbeing is relevant to the field of positive psychology given that the positive human experience is one of the main branches of positive psychology identified by Csikszentmihalyi and Seligman (2000). Diener (2000) defines wellbeing as a broad group of phenomena including "emotional responses, domain satisfactions and global judgements of life satisfaction" (p. 277). A slightly more specific definition is put forward by Keyes, Shmotkin and Ryff (2002), who define wellbeing as an individual's evaluation of life in terms of satisfaction and balance between positive and negative affect. Positive affect can be thought of as the positive emotions people experience, and their resulting positive evaluations of these emotions. Early research on wellbeing was conducted by Wilson (1967), who, somewhat famously in the field, concluded that a happy person was a "young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, job morale [and] modest aspirations" (Wilson, 1967, p.1) Since then, researchers have sought to further elucidate what exactly is associated with people being happier, and having greater wellbeing. Positive psychologists have sought to shed light on which experiences or phenomena induce greater wellbeing, or happiness, in their pursuit to optimize people's everyday life. Research has indicated that age and educational status are related to higher wellbeing, specifically those in middle adulthood, and those with an educational advantage such as higher learning report greater wellbeing (Keyes et al., 2002). Other studies have shown that extraversion is related to positive affect, whilst neuroticism has been found to be related to negative affect (Watson & Clark, 1992).

Health and wellbeing are also known to be positively correlated, with evidence indicating that positive emotional experiences may be associated with healthier patterns of physical function in the cardiovascular system and the immune system (Salovey, Rothman, Detweiler & Steward, 2000). Steptoe, Wardle and Marmot (2005) demonstrated that positive emotions might reduce inflammation, finding that those who experienced positive emotions more regularly exhibited lower levels of cortisol, signifying a reduced stress or inflammatory response. A common theme for research in this area is a focus on wellbeing in the elderly, in an attempt to improve the quality of life, and there is evidence to suggest a general relationship between wellbeing, positive affect and reduced mortality in the elderly (Chida & Steptoe, 2008; Cohen & Pressman, 2006). Other studies indicate that positive affect seems to reduce the risk of becoming frail later in life (Ostir, Ottenbacher & Markides, 2004), as well as being protective against stroke (Ostir, Markides, Peek & Goodwin, 2001).

Wellbeing has been linked to character strengths through life satisfaction, as well as when directly measured as subjective wellbeing. Research by Gillham et al. in 2011 indicated that in an adolescent sample, transcendence strengths (meaning, love, zest and hope) temperance strengths (prudence, self-regulation, honesty, perseverance and judgement) and intellectual strengths (curiosity, love of learning, originality and appreciation of beauty) all predicted significantly greater life satisfaction, whilst temperance strengths reported lower depressive symptoms (Gillham et al., 2011). Interestingly, this study found none of the strengths were associated with happiness. Other researchers found that individuals who used their strengths more than others experienced greater wellbeing, through increased goal progress and attainment (Linley, Nielsen, Gillett & Biswas-Diener, 2010). This finding has also been replicated in athletic samples, with a recent study that investigated young, national level athletes finding that the extent to which athletes' organisational strengths were enabled (i.e., the extent to which the organisation itself allowed the athletes individual strengths to be

expressed) was positively and significantly correlated with flourishing (Stander, Rothmann & Botha, 2016).

A related, but distinct construct to wellbeing is flourishing, which can be thought of as a central component to living within an optimal range of functioning (Fredrickson and Losada, 2005; Ryff & Singer, 2000). While the two terms (wellbeing and flourishing) are occasionally used interchangeably due to their similar definitions (wellbeing can be defined as a balance between positive and negative affect [Keyes et al., 2002)]), this study treated wellbeing and flourishing as separate constructs, each with its own variable. Despite this distinction, there is evidence to suggest that an association exists between flourishing and wellbeing. Researchers have found that positive affect, when a direct response to a flourishing experience, widens attention (Fredrickson & Branigan, 2005), increases creativity (Isen, Daubman & Nowicki, 1987) and results in greater levels of happiness (Fredrickson & Joiner, 2002).

In New Zealand, a recent study found that only 24% of people met the criteria for having optimal wellbeing, which was evaluated using a scale that measured mirrored diagnostic criteria for mental illness (i.e., the scale assessed to what extent individuals showed no signs whatsoever of any mental illness). Researchers observed that regular exercise, high income, low levels of daily sitting and a healthy diet were associated with a greater chance of having optimal wellbeing, whilst those who experienced restless sleep or were obese were much less likely to display optimal wellbeing (Prendergast, Schofield & Mackay, 2016).

Sport Psychology

Sport psychology is characterised as the study of people and their behaviour, in the context of sport and exercise, and the practical application of this study (Weinberg & Gould,

2014). Some of this study is centred on improving high level athletic performance, and this might include helping athletes concentrate, regulate arousal, deal with stress, work together as a team or improve their decision making. Furthermore, sport psychology tries to understand the long-term impact of participation in sport on personal development (Hanin & Stambulova, 2004).

One of the more pertinent areas of sport psychology to this research is the topic of coping resources in athletes, and their ability to deal with turmoil and loss. Losing is an inherent part of any sport, and so ensuring athletes are well equipped to deal with this scenario is a key role of the sport psychologist. Athletic trauma, or sudden career termination (sometimes due to severe injury) has been linked with depression (Blinde & Stratta, 1992). Coping strategies that have been shown to be effective when used by athletes include thought control strategies, task focus strategies, behavioural and emotional control strategies (Gould, Eklund & Jackson, 1993). One of the main sources of trauma experienced by athletes in Blinde and Stratta's study (1992) was athlete injuries. Research has indicated that at an emotional level, athletes experience elevated levels of frustration, depression and anger following an injury (Manuel et al., 2002; Smith, Scott, O'Fallon & Young, 1990). Other researchers sought to take a closer look at the process by which emotions change in the immediate aftermath of an injury. During interviews conducted immediately after the sustainment of an injury, athletes from a variety of sports including rugby, football, lacrosse and volleyball exhibited low levels of self-esteem, as well as experiencing negative affect (negative thoughts and emotions, and resulting evaluations) characterised by frustration, fear, depression and worry (Tracey, 2003). One week after the injury, these same athletes reported a strong influence from visual cues on their emotions, usually brought about by being able to see reductions in swelling/bruising making the injury appear to be getting better. This led to feelings of frustration as the reality was that in most cases the athlete was still far from being

fully recovered. At 3 weeks after the injury, athlete emotions had shifted from negative to positive, confidence had improved, and athletes felt a sense of relief, as well as viewing their injury as a challenge, rather than a trauma (Tracey, 2003). Other evidence indicates that psychological problems can occur in conjunction with athletic injury, namely stress, anxiety, depression and anger (Brewer, Van Raalte & Linder, 1991; Gipson et al., 1989). Sports physicians surveyed by Brewer and colleagues (1991) showed a moderately positive attitude towards the inclusion of a sports psychologist to help the athlete deal with the psychological consequences of injury, supporting the notion that there is indeed a role for a sport psychologist during an athlete's recovery process.

Injury Incidence in Sports

Considerable research has investigated the incidence of sporting injury, so as to better understand and help athletes. A study which followed high school athletes over three years in the United States found that 50 out of every 100 gridiron athletes, 23.4 out of 100 soccer players and 18.2 out of 100 field hockey players sustained an injury (Powell, Barber-Foss, 1999).

Injury Incidence in Rugby. In research focusing on rugby, injury rates have been reported as high as 72 out of 100 players sustaining an injury during the season (Bird, Waller, Marshall, Alsop, Chalmers & Gerrard, 1998), while a study assessing elite rugby in the United Kingdom observed an injury rate of 91 injuries per 1000 player-hours (Brooks, Fuller, Kemp & Reddin, 2005). Injury incidence in elite New Zealand rugby has not been assessed, however researchers from Australia observed 69 injuries per 1000 player-hours in an elite sample (Bathgate, Best, Craig & Jamieson, 2002). Further work in New Zealand with amateur rugby league players saw an injury incidence of 497.6 injuries per 1000 player hours (King, Gabbett, Dreyer & Gerrard, 2006).

Injury Incidence in Football. In football, comprehensive research at the elite European level indicates that injuries typically occur at a rate of 8 injuries per 1000 player hours, however the injury rate was far higher in games (27.5) as opposed to training (4.1) (Ekstrand, Hagglund & Walden, 2009). Very little research has investigated football injury incidence in New Zealand at the elite level, however one study did look at youth amateur football players, and observed a game injury rate of 16.2 injuries per 1000 player hours (Junge, Cheung, Edwards & Dvorak, 2004).

Injury Incidence in Hockey. There was less existing evidence for hockey, and most existing literature investigating injury incidence in field hockey focuses on females, since this sport is predominantly played by females in the countries where it is studied, such as the United States. Data investigating women observed an injury rate of between 7.9 (Hootman, Dick & Agel, 2007) and 15.2 (Stevenson, Hamer, Finch, Elliot & Kresnow, 2000) per 1000 player hours.

Applicability to the New Zealand Context. Injury incidence has been measured in multiple ways in all three sports of interest to this study, however it must be noted that while there is reasonably extensive literature on football, rugby union and, to a lesser extent, hockey from around the world, there is little research that has focused on an amateur sample of athletes in New Zealand. It is important to take into consideration cultural, personal or contextual factors when interpreting results from studies such as those mentioned above, which feature professional athletes in different countries. While there is little direct research assessing the differences in injury incidence between professional and amateur athletes, amateur athletes generally train less frequently than professional athletes and lower overall contact hours could produce lower injury rates. Furthermore, the techniques or manoeuvres, as well as the physicality, required at an elite level of sport are likely to be more complex and demanding, and this could produce inflated injury incidence outcomes in professional

samples. Additionally, differences in methods used to measure injury incidence in elite and recreational samples could account for the differing outcomes observed. For example, Bird et al., (1998) assessed injury incidence using a percentage of players who sustained an injury (72 out of 100), whilst, Bathgate et al., (2002) used 'player-hours' to measure injury incidence. Both units have their own merits, for example, 'player-hours' describes the level of exposure required before an athlete can expect to receive an injury, whilst percentage measures like that used by Bird et al. can inform coaches how many players they might expect to sustain an injury overall. Nevertheless, these measures assess injury incidence differently, and this makes direct comparisons between amateur and professional athletes difficult. As such, these studies are better suited to provide a framework through which the results from this study can be interpreted.

In summary, football and hockey have reasonably lower injury rates when compared to rugby union (69 injuries/1000 hours compared to 27.5 and 15.2 for rugby, football and hockey respectively), which may be attributed to the full contact nature of rugby union when compared to hockey and football. Table 3 collates the above injury data.

Table 3.

Injury Incidence in Rugby, Football and Hockey

Study	Sport	Country	Level of Participation	Injury rate	Unit
Ekstrand et al., 2009	Football	Europe	Elite Club	8/1000	Injuries per 1000 player-hours
Junge et al., 2004	Football	New Zealand	Youth Amateur	16.2/1000	Injuries per 1000 player-hours
Powell & Barber-Foss, 1999	Football	United States	High School	23.4/100	Sustained an Injury
	Hockey	United States	High School	18.2/100	Sustained an Injury
Hootman et al., 2007	Hockey	United States	College	7.9/1000	Injuries per 1000 player-hours
Stevenson et al., 2000	Hockey	Australia	Club	15.2/1000	Injuries per 1000 player-hours
Bird et al., 1998	Rugby Union	New Zealand	Various Club	72/100	Sustained an Injury
		New Zealand	Various Club	10.8/100	Injuries per 100 player-games
Brooks et al., 2005	Rugby Union	Great Britain	Elite Club	91/1000	Injuries per 1000 player-hours
Bathgate et al., 2002	Rugby Union	Australia	Elite Club	69/1000	Injuries per 1000 player-hours
King et al., 2006	Rugby League	New Zealand	National Club	497.6/1000	Injuries per 1000 player-hours

Injury Measurement in Sport

Table 3 summarises injury incidence in rugby, football and hockey, but also highlights an issue when interpreting research on this topic. There are several units which can measure 'injury incidence' and this complicates direct comparisons between studies. One of the more straightforward methods to measure injury rates is to take the number of injuries observed during the study and the number of players being observed, and divide the former by the latter, and converting this to a percentage. This produces a simple measure denoting the percentage of players who sustained an injury, allowing researchers to estimate the number of players who might be expected to suffer an injury given similar conditions. This is not always ideal since elite players or studies that run for several seasons will almost always

observe a large number of injuries, often several per player, and so this percentage can be misleading in that it does not necessarily refer to the level of exposure needed to expect an injury. 'Player hours' is a common operational term when working with injury rates in professional teams, which uses time spent on the field playing and the number of injuries sustained, and calculates injury incidence over 1000 hours of play, training or both, resulting in the unit 'injuries per 1000 player-hours'. A less common measurement, player-games, calculates the rate of injury using games played and number of players who played in games is sometimes used. Perhaps the more accurate measurement is the player-hours measure, since it controls for players who might not have played a whole game, but still sustained an injury during playing time. In this way, it is a better measure for the exposure to a sport and how many injuries we might expect from a given exposure.

Another issue in injury incidence research is the definition of injury itself. Differing definitions of injury can sometimes lead to over- or under-reporting of injuries, leading to inflated or reduced injury incidence. An example of this can be seen in the study by King and colleagues (2006) investigating rugby league. They used an all-encompassing definition of injury as "any pain…that required advice and/or treatment after a rugby league sevens match" (p. 111) and recorded an injury rate of 497.6 injuries per 1000 player hours, a figure which is considerably higher than other figures in this field (see Table 3). Because of the all-encompassing definition of injury used, it is possible that players might require "advice" but not actually have sustained an injury of any severity. A review on the topic, albeit focusing on rugby league rather than union, noted that different definitions of injury could lead to different injury rates being reported, with differences observed between studies that used all-encompassing definitions, or definitions which include time lost due to injury (King, Hume, Milburn & Guttenbeil, 2010).

Psychological Models of Injury

Various models have been proposed to explain both the response to, and prediction of, sporting injury, so as to aid in the treatment and prevention of sporting injuries. There are three main types of injury models in sport psychology. These include; (i) stage based models, which describe an athlete's progress through several stages immediately after injury, (ii) cognitive appraisal models which take into account personal and situational factors, and (iii) more recent integrative models.

Stage models were originally derived from models of grief and loss, and are based upon the premise that an injured athlete passes through a number of predictable stages, and treat the injury as if the athlete had suffered a 'loss' (Rotella, 1985). A review of the literature on loss by Wortman and Silver (1989) concluded that individuals varied largely in their response to loss, and that there was no evidence supporting a stage-like pattern of response to negative life events. Due to this high level of individual variance, stage models are not suitable for use in understanding sporting injury.

Brewer (1994) suggested cognitive appraisal models might provide an alternate way to conceptualize the response to athletic injury, without the issues of individual variation that plagued stage models. These models treat injury as a stressor, and the response is seen through this light. After an athlete is injured, the individual appraises their injury, which is influenced by their own personal factors (personality, for example) as well as the relevant situational factors, and this determines an emotional response. This emotional response then leads to a behavioural response. Figure 1 illustrates the relationship between cognitive appraisal and the associated responses.

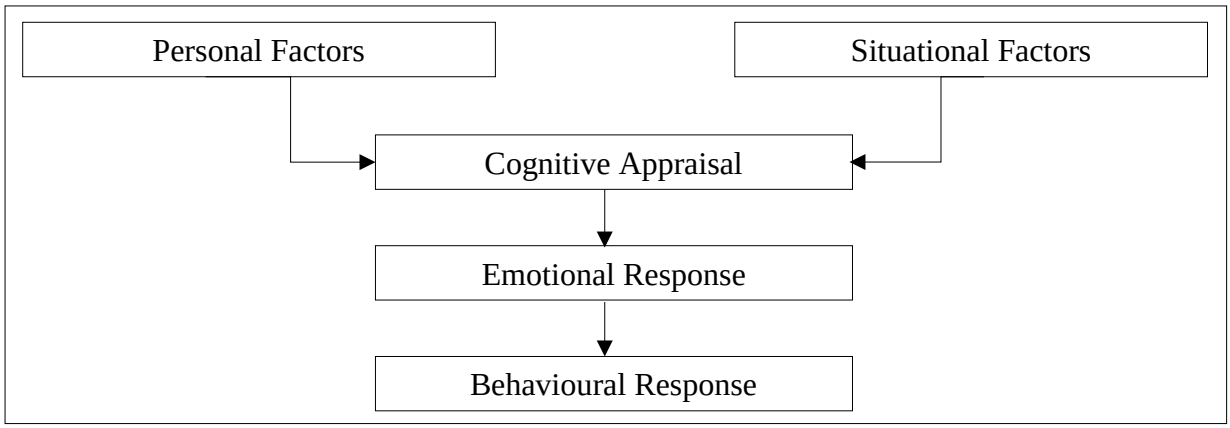

Figure 1. Cognitive Appraisal Model. Adapted from "Review and critique of models of psychological adjustment to athletic injury." By B.W. Brewer, 1994, Journal of Applied Sport Psychology, 6(1), p. 91. Copyright 2017 by Taylor and Francis. Adapted with permission.

Building upon the Cognitive Appraisal model, Williams and Andersen (1998) proposed the Stress and Injury model. This model postulates that personality, coping resources and stressor history influence the stress response, which is comprised of both cognitive appraisals and physiological/attentional changes, both of which are in a bi-directional relationship. This model's inclusion of the physiological and attentional changes that are a part of a stress response is what differentiates it from the simpler cognitive appraisal model. Interventions are also included as a way to mediate the stress response. Figure 2 represents the model and the bi-directional relationships.

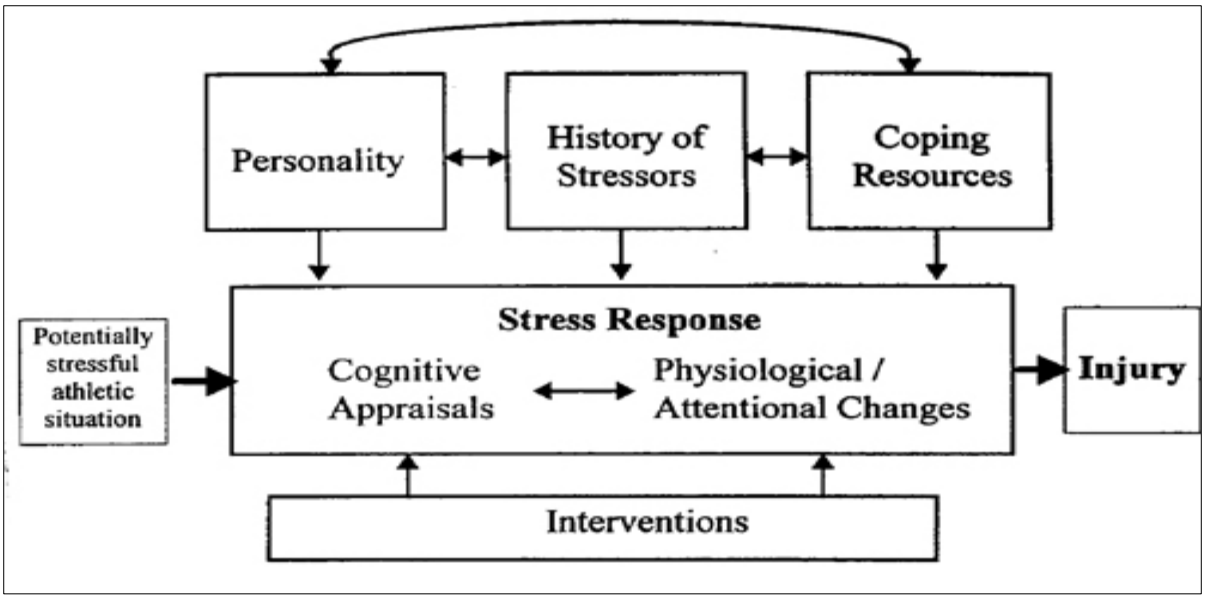

Figure 2. The Stress and Injury Model. Reprinted from "Psychosocial antecedents to sport injury: Review and critique of the stress and injury model" by J.M. Williams and M.B. Andersen, 1998, Journal of Applied Sport Psychology, 10(1), p. 7. Copyright 2017 by Taylor and Francis. Reprinted with permission.

Another recently proposed model is the Integrated model, put forward by Wiese-Bjornstal, Smith, Shaffer and Morrey (1998), which is more complex than the two previously mentioned injury models. Wiese-Bjornstal et al., posit that certain pre-injury factors (personality, history of injuries, coping resources and interventions) are overarching factors which also influence the cognitive appraisal, along with the traditional personal and situational factors. They list personal factors such as injury history, severity and type, as well as individual differences grouped under psychological (e.g. personality, self-perception, athletic identity, psychological and coping skills), demographic (age, gender, ethnicity etc.) and physical (current physical health). Their model then treats the cognitive appraisal, emotional response and behavioural response in a cyclical manner, where cognitive appraisal informs emotional response which informs behavioural response, which then leads to a new, updated cognitive appraisal. This recovery cycle thus affects the physical and psychological outcomes of the recovery process. A diagram of this model, Figure 3, is produced below recreated from Wiese-Bjornstal et al. (1998).

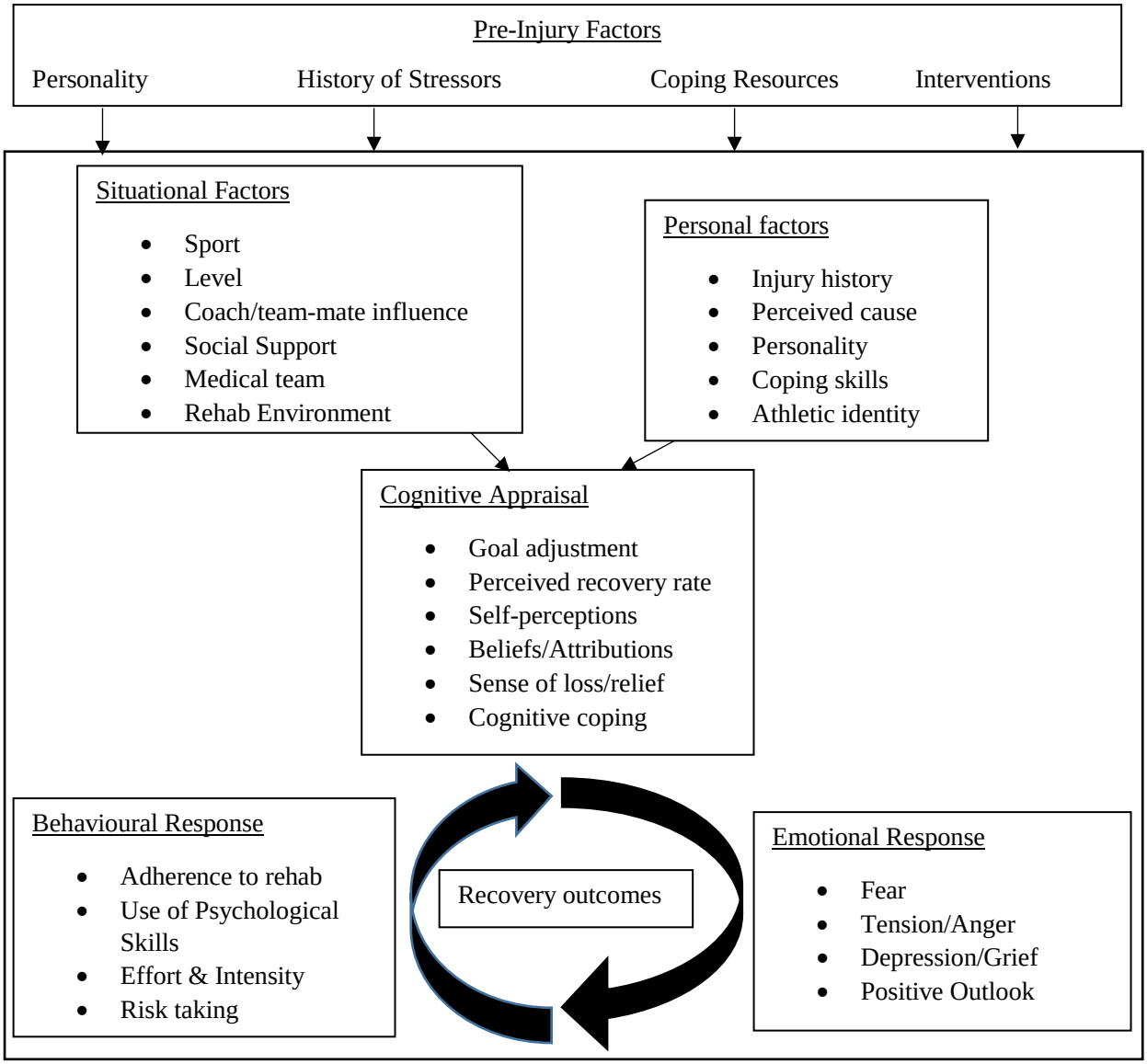

Figure 3. The Integrated Model. Adapted from "An Integrated Model of Response to Sport Injury: Psychological and Sociological Dynamics" by D.M Wiese-Bjornstal, A.M. Smith, S.M. Shaffer and M.A. Morrey, 1998, Journal of Applied Sport Psychology, 10(1), p.49. Copyright 2017 by Taylor and Francis. Adapted with permission.

The personality factors that affect the stress response in both the Integrated and Stress and Injury models are of specific interest to this current study. Wiese-Bjornstal et al. (1998) refer to self-esteem and self-efficacy as key factors which influence the cognitive appraisal of injury. Indeed, athletes who have successfully recovered from injuries in the past can have higher self-efficacy for injury recovery than others (Shaffer, 1992). This may explain why injury history can play a role in the rehabilitation process, likely through increased

rehabilitation self-efficacy. Williams and Andersen (1998) include six clear personality aspects which they see as being related to injury rehabilitation: hardiness, locus of control, sense of coherence, competitive trait anxiety, achievement motivation and sensation seeking.

Injury Prediction

While the models mentioned above are highly useful to sport psychology practitioners, they do not necessarily help predict individual athletes who may be more or less at risk of injury. Rather, they simply acknowledge the existence of certain factors which can contribute to or exacerbate a stress response. Research in the 2000s focused more on teasing out exactly what the 'personal factors' mentioned in the models were and how they predicted injury. As Steffen, Pensgaard and Bahr (2008) point out, "understanding injury risk factors [is] necessary to target the injury prone athlete and develop injury prevention measurements" (p. 1). Most research in this field has investigated risk factors that might seem obvious. For example, Ivarsson and Johnson (2010) found somatic and psychological trait anxiety, stress susceptibility and trait irritability significantly predicted injury in senior Swedish soccer players. Trait anxiety as an injury predictor was supported further in work by Ivarsson, Johnson and Podlog (2013) in professional footballers. In his review of the topic, Junge (2000) found that injured athletes tended to be willing to take risks, characterized as a lack of caution and adventurous spirit, when compared to uninjured athletes. Mood and stress were shown by Galambos, Terry, Moyle and Locke (2005) to be significant predictors of injury in elite athletes. Specifically, they observed that measures of mood, specifically vigour, depression and tension, as well as perceived life stress predicted their injury variables. Life stress (Steffen et al., 2008), and "daily hassles" (p. 19) (Ivarsson et al., 2013) were also found to be predictors of athletic injury. Very little research has investigated personality traits outside easily and quantifiable and established variables like anxiety, life stress and depressed mood. One study investigated temperament predictors of injury in ice hockey players. While

temperament measures like extraversion were not correlated with injuries, sensation seeking and boredom susceptibility were, although this study used a very small sample and so should be interpreted with caution (Osborn, Blanton & Schwebel, (2009).

Research on Positive Psychology in Sport

Literature applying positive psychology to sports is fairly sparse, which may be due to the relatively recent interest in positive psychology. Character strengths have been involved in minimal sport-related research. One study assessed character strength activation during sporting events and found that kindness, loyalty, hope, optimism and zest were strongly activated during charity sport events (Coghlan & Filo, 2016). Another group of researchers found that character strengths were strongly related to positive health behaviours (Proyer, Gander, Wellenzohn & Ruch, 2013). A recent study assessing character strengths in athletes suggests that strong family functioning was associated with the development of the athlete's character strengths, for both elite and recreational athletes (Raimundi, Molina, Schmidt & Hernandez-Mendo, 2016). Another 2016 study by Stander, Rothmann & Botha found that the extent to which the organisation itself allowed the athletes individual strengths to be expressed led to the athletes experiencing more flourishing experiences.

Wellbeing has been examined fairly extensively in regards to its ability to predict some health outcomes, and has also been studied in relation to sport. Simply participating in sport at any level has been observed to result in reductions in negative affect, depression, pessimism and higher positive affect and self-efficacy (Malebo, van Eeden & Wissing, 2007). Wagstaff and Leach (2015) point to positive affect as being able to elicit greater self-efficacy, motivation, attention and problem solving in athletes. A study by Totterdell (2000) found significant associations between players' positive moods and subsequent subjective rating of their performance.

Summary

Summarising the above, positive psychology, and its focus on optimal human functioning, has potential for application in the sport and athlete context, as optimal functioning is a fundamental aspect of what athletes strive to achieve. To get the most out of mental training (and physical training), an athlete should seek to not only avoid or ameliorate the negative aspects of his or her performance, but facilitate and emphasize the positive ones. Character strengths are an established, validated measure of positive traits that constitute important aspects of one's personality, and an athlete's character strength profile can inform coaches as to how to tailor an athletes training or injury rehabilitation program. Despite this, surveying the character strengths of athletes is not current practice. Kauffman (2006) lays out the value of utilising character strengths for coaches, commenting that assessing an athlete's strengths can help identify what motivates them to achieve optimal performance, and this can, in turn, inform their coaching significantly, especially since many athletes have never even seen a strength profile. While assessing and measuring the psychological well-being of athletes is slightly more established, there is still a dearth of relevant literature in this area. Moreover, there appears to be little or no research investigating if both character strengths and wellbeing could be predictors of, or antecedents to, injury in athletes, despite the fact that they might well be linked, given the recognised association between personality factors and injury.

Research Aims and Hypotheses

The aims of this study were to look for relationships between character strengths, wellbeing and sporting injury in a recreational athletic sample. A secondary aim was to provide descriptive statistics about the character strength profiles of recreational athletes, to permit a comparison between sports, and between athletes and the general public. A further aim was to collect data on athlete injury incidence in three sports which appear to be

understudied in amateur athletes (rugby, hockey and football). The main research questions were:

1. Do any specific character strengths predict an increase or decrease in injury incidence in athletes?
2. Does wellbeing predict injury incidence in athletes?
3. Are there any differences between the character strength profiles of athletes in three different sports?
4. Are there any differences between the character strength profiles of athletes and the general public in New Zealand?

The study's hypotheses pertain to character strengths and wellbeing, and how they relate to injury rates. More specifically:

Hypothesis 1- Athletes who score highly in the character strengths of zest, bravery, curiosity and hope, will experience more injuries and miss more games and training sessions than those who are lower in these strengths.

Hypothesis 2- Athletes who score highly in prudence will experience less injuries and miss fewer games and training sessions than those who do not score highly for prudence or temperance.

Hypothesis 3 – Athletes with higher wellbeing will experience fewer injuries and miss less training sessions and games than athletes with lower wellbeing.

Hypothesis 4 – There will be no difference between the character strength profiles observed between athletes of differing sports, or between athletes and the general public.

Hypothesis 5 – There will be no difference between the character strength profiles observed between athletes and the general public.

Chapter 3. Method

The basic design of this research was a cross-sectional, observational study which allowed the researchers to recruit a reasonable sample size across multiple sports. Data were gathered from male senior rugby, hockey and football players over the age of 18 years. These athletes were initially approached at training sessions throughout the season and recruited to take part in the study. Data included measures of character strengths, wellbeing and injury incidence. Athletes recruited during the season provided injury data once the 2016 playing season had finished.

Recruitment

Athletes were recruited through acquaintances of the researcher who were part of a team playing either rugby, football or hockey. Through these acquaintances, the researcher contacted the team's coach and made arrangements for meeting the athletes. Following this, a training session was attended by the researcher, and once training had finished, the team were approached and spoken to about the study and what it would entail. A Participant Information Sheet (see Appendix A) was also handed to the athletes to read. Athletes interested in participating in the study were then given the opportunity to provide their email address to the researcher, for further contact. Since athletes volunteered their information so as to take part in the study, this non-representative sample is a convenience sample, which has been used in both positive psychology and in sport psychology research investigating injury (Ivarsson et al., 2013; Seligman, Steen, Park & Peterson, 2005). While not a random sample, the researcher drew on various teams that were geographically separate in an attempt to achieve as representative a sample as possible. All potential participants who were approached provided their contact information to the researcher, and only two participants (one footballer, one hockey player), indicated explicitly later on that they did not wish to participate.

Participants

The sample for this study was made up of male amateur athletes who played either rugby, field hockey or football at a competitive club level. Inclusion criteria for participants comprised being male and playing for a rugby, football or hockey team in a large urban area in New Zealand, being over 18 years of age and participating in the majority (over 75%) of the sporting season, (i.e., were not going to miss large portions of the season due to travel or work). Potential participants were asked during recruitment if they would be present for over three quarters of the season. Exclusion criteria included being under 18 years of age, and not having access to a computer and internet so as to fill out and return the online surveys. Participants who returned one but not both surveys were excluded from the final results. Participants were also not eligible if they played for a social, non-competitive team, or received any compensation for playing their sport (i.e., were 'professional athletes'). Suitable sports teams were sourced through acquaintances of the researcher in a convenience sampling approach. After receiving the surveys, participants received fortnightly reminder emails asking them to fill out the surveys. Participants who failed to complete the surveys within the data collection period were not included in the study.

Instruments

Measures of character strengths were assessed using the Values in Action Inventory of Character Strengths (VIA). Wellbeing was assessed using the Work on Wellbeing survey, and injury data were collected via self-report responses to questions emailed to the participants.

Character Strengths. Character strengths were assessed using the VIA-120 Character Strength survey (see Appendix B). The VIA survey has been extensively used in research as a measure of character strengths (Biswas-Diener, 2006; Niemec, 2013; Park,

Peterson & Seligman, 2006; Peterson & Seligman, 2004). The original, full length VIA inventory of questions contains 240 items, 10 items assessing each of the 24 character strengths. These 24 strengths were appreciation of beauty and excellence, bravery, creativity, curiosity, fairness, forgiveness, gratitude, honesty, hope, humility, humour, judgement, kindness, leadership, love, love of learning, perseverance, perspective, prudence, self-regulation, social intelligence, spirituality, teamwork and zest. A short form survey was created using half the number of questions from the full survey, by taking the 10 items for each character strength and reducing it to five items using the five highest item-scale correlations (Peterson & Seligman, 2004). This provided a 120 item short-form survey which was used in this study in the interest of minimizing participant burden and maximising retention of participants. The survey assessed character strength endorsement by providing participants with a number of statements, each of which pertain to a particular strength. Participants then rated each statement on a five point Likert scale indicating to what extent the participant agrees with or endorses this statement. The VIA-120 returned data on each of the 24 character strengths as a score out of 5. Peterson and Seligman (2004) report that for the long form VIA inventory, all scales showed alphas of over .70 and test-retest reliability was found to be substantial even after a four month period. Internal consistency analysis conducted by the VIA Institute on Character showed that the 120 item short form had a high consistency coefficient (.79) with the long form survey (VIA Institute on Character, 2014).

Wellbeing. Wellbeing was assessed through the Work on Wellbeing survey, developed in 2013, and provided data on 4 measures: Wellbeing, Flourishing, Resilience and Health/Lifestyle. The survey includes a battery of 50 questions, which assess the aforementioned four outcomes. Participants rated to what extent they agreed with statements about these topics on a 7-point Likert scale, or to what extent they were satisfied with various aspects of their life on a 10-point scale, ranging from “Not at all satisfied” to “Completely

Satisfied". While this survey has not been used extensively by researchers as yet, it draws upon existing, established literature by Diener, Inglehart and Tay (2013) for the Wellbeing outcome, Diener et al. (2010) for the Flourishing measure, Smith, Dalen, Wiggins, Tooley, Christopher and Bernard (2008) for the resilience measure, and Jarden et al. (2013) for the health and lifestyle measure. Four items were added to this survey for the current study, so as to assess injury. These questions asked whether participants had been injured in the 2016 sporting season, accompanied by the operational definition used for injury in this study "An injury is any trauma that happens while playing or training for your sport, which requires you to cease playing or training in that session and/or miss an ensuing training session or game". If participants indicated they had been injured, they were then asked: (a) how many distinctly separate injuries they had sustained in that season (including any pre-season), (b) how many games and how many training sessions the participant had to miss and/or not finish directly due to their injury. Each of these measures were answered on a scale ranging from 1-10 or more. Appendix C contains all questions asked as part of the WoW survey.

Injury Incidence. Injury variables included the binary variable of injured versus not injured, the number of injuries sustained, the number of games missed due to injury, the number of training sessions missed due to injury, and total time missed due to injury. The definition of injury used in this study accords well with prior research (Bathgate et al.,2001; Brooks et al., 2005), however the outcome variables differed from these studies since a subjective, self-recall measure was used to assess injury incidence, with data collected retrospectively from the athletes themselves. A proxy measure was also formulated denoting average injury severity by dividing the total time missed from sport by the number of injuries.

Data Collection

Once coaches from several teams had been sourced through acquaintances of the researcher and had agreed to participate, teams were approached in the latter half of the season, with surveys being emailed to athletes towards the end of their respective sporting season. The data collection period ran from July to October, and athletes were sent fortnightly reminder emails to complete the surveys until the cessation of the data collection period. Most athletes did not complete the surveys until the final week of their sporting season or in the ensuing weeks post-competition, however athletes could return the surveys up to one month after the completion of their competition. If an athlete returned the surveys earlier than in the final week of their sporting competition, they were followed up at the completion of their sporting season about any injuries they had sustained. This was the case for approximately one third of participants. Following the initial recruitment session, the athletes were emailed an invitation to participate in the research, which briefly reiterated the goals of the study and what would be involved, and then provided web links to the required surveys (the Values in Action survey and the Work on Wellbeing survey, see appendices B and C). This email also included their participant code, a five digit alpha numeric code which allowed them to be identified by the researcher, but to remain anonymous in the study data. Once they clicked on the first link to the Wellbeing survey, they were directed to the same Participant Information Sheet (see Appendix A) that was given to them to read during the initial recruitment, and then asked to provide informed consent before they began any survey. Participants could also select whether they wished to have their individual results sent to them via email following the survey. After the Wellbeing questions had been completed, questions assessing injury were answered by participants. Following completion of the Wellbeing survey, participants were directed to the Values in Action survey, which they then completed.

Statistical Analysis

All data were analysed using IBM Statistical Package for the Social Sciences 23 (SPSS). Mean averages and standard deviations were calculated for all variables. Linear regressions were also performed to assess whether any of the character strengths or wellbeing outcomes could predict injury variables across the sample. To assess the main research question, first, a binomial logistic regression was carried out assessing whether or not each individual character strength or wellbeing score was associated with an increased likelihood of sustaining an injury during the season, for the three sports, as well as for the sample as a whole. Injuries were then grouped into categories denoting the number of injuries: zero injuries, one injury and two or more injuries and a multinomial logistic regression was carried out, to look for any associations between character strengths, wellbeing and the number of injuries sustained across the three sports and for the total sample. Both the binary and multinomial logistic regression were carried out assessing all individual character strengths. One-way ANOVA tests were carried out to investigate whether there were between group differences between the character strengths scores, the wellbeing scores, and the injury data in different sports. Linear regression was carried out to test for any general predictors of continuous injury outcomes for the sample as a whole. A p value of less than .05 was considered the threshold to indicate significant results, following conventions used in previous, related literature (Park et al., 2004).

Ethical Considerations

This methodology was approved by the Auckland University of Technology Ethics Committee on the 13th of May (Application ID: 16/153) and recruitment began subsequent to this. Participants were given a Participant Information Sheet (see Appendix A) at the initial recruitment, and were given the opportunity to not provide any contact information. Furthermore, participants could withdraw from the study at any time, and have their data and

information deleted if they wished. The decision of whether or not to participate held no bearing on their performance in their sport, and their coach was unaware of who did and did not participate, to prevent any negative consequences for athletes who did not participate. Participants were assigned a participant number so as to anonymise their data during analysis. The list of participants and their participant codes was stored separately to the study data in the interests of maintaining anonymity. All data were stored on password protected computers at the Auckland University of Technology.

Chapter 4. Results

Data collected from this research included individual character strength profiles, wellbeing data and injury data. The character strength profile refers to the strength scores for each participant as assessed in the VIA survey. These scores could range from 1 to 5 and were produced for each of the 24 strengths. There were four wellbeing outcomes; Wellbeing, Resilience, Flourishing and Health and Lifestyle. Finally, injury data were collected from 5 variables; number of injuries, number of games missed, number of training sessions missed, number of total sessions missed and injury severity. Descriptive statistics are reported below for all data, as well as the results from bivariate correlations between character strengths, wellbeing and injury outcomes, one-way ANOVA to test for between group differences, linear regressions to look for any predictors of injury for the whole sample, and logistic regressions assessing the odds of injury for the different sports.

Participants

Contact information was provided to 144 potential participants (46 rugby, 38 hockey and 60 football). Two participants explicitly stated after receiving the surveys that they did not wish to take part in the study. 142 participants were provided with the study surveys, of whom 95 returned both surveys, giving a completion percentage of 66.9% for the total sample. Figure 4 outlines the participant attrition at each stage.

Figure 4.

Participant Recruitment Flowchart

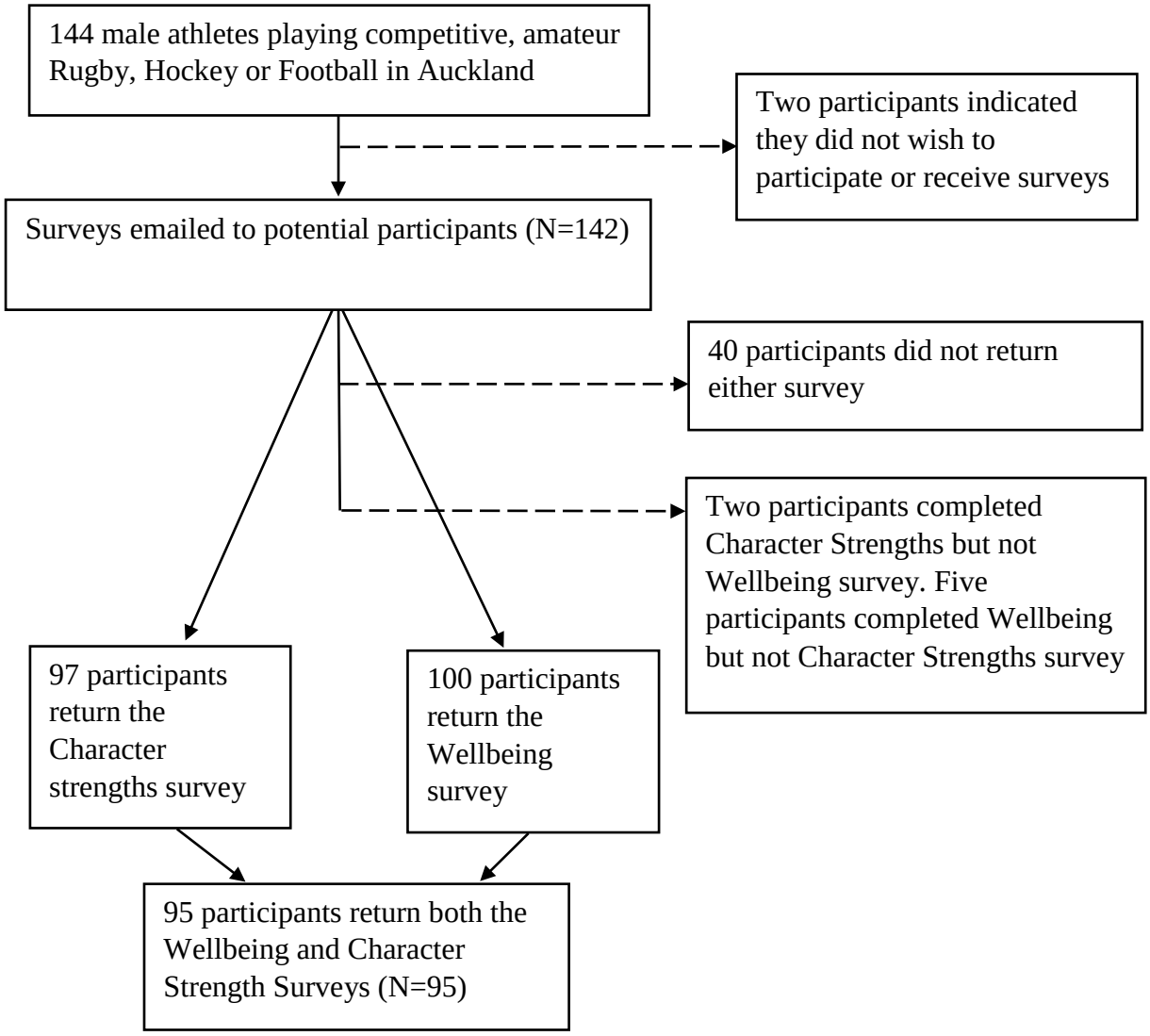

Figure 4. Flow chart denotes participant retention throughout the recruitment process.

The number of athletes approached, and the numbers who completed both surveys is presented below in Table 4.

Table 4.

Athlete Response Rate

	Rugby	Hockey	Football	All Sports
Athletes Approached	46	38	60	142
Completed Survey	34	24	37	95
Did not Complete	12	14	23	47
Percent Complete	73.9	63.2	61.7	66.9

From rugby, two teams were approached, each from different clubs in central Auckland, one playing weight restricted rugby, and another playing open weight, age restricted (Under 21) rugby. A total of 46 participants provided contact information so that surveys could be sent to them, and 34 returned both surveys, a completion rate of 73.9%.

Four hockey teams were approached, from various locations around Auckland, including the North Shore, West Auckland and Central Auckland, all of which played in the premier or premier reserve club division. Surveys were emailed to 38 potential participants, and 24 returned them, giving a completion rate of 63.2%.

A total of five football teams were approached from various areas in Auckland (two each from the North Shore and Central Auckland and one from West Auckland) and provided a group of 60 potential respondents, of which 37 completed both surveys, producing a response rate of 61.7%.

Injury Incidence and Severity.

Table 5 shows the injury data provided by the respondents. When calculating the average number of injuries sustained, participants who did not suffer any injuries over the

season were excluded, so as to give insight into the injury trends within the injured athlete sub-population.

Table 5.

Injury Statistics for the Sample

				Number of Injuries						
Sport	Injured	Not Injured	Total	0	1	2	3	4	5	Average
Rugby	18	16	34	16	9	6	2	1	0	1.6
Hockey	16	8	24	8	8	4	1	1	2	2.06
Football	28	9	37	9	13	11	3	0	1	1.75
All Sports	62	33	95	33	31	20	6	2	3	1.17

Table 5 shows that approximately two thirds of the total sample received at least one injury during the season. Within the individual sports, 18 out of 34 (52.9%) rugby players, 16 out of 24 (66.7%) hockey players and 28 out of 37 (75.7%) football players sustained an injury over the course of the season. When players who did not suffer an injury were excluded, the highest average number of injuries was observed in hockey players, followed by rugby players and football players respectively.

Table 6 provides more details into the impact injuries had on players in terms of time spent away from sport, for each sport and the total sample.

Table 6.

Impact of Injury on Injured Players

Sport	Average Number of Games Missed	Average Number of Training Sessions Missed	Average Number of Sessions Missed	Average Injury Severity[1]
Rugby	2.17	4.11	6.22	3.85
Hockey	3	4.06	7.06	3.47
Football	3.46	4.429	7.89	4.81
All Sports	2.97	4.24	7.19	4.18

Note.[1] Average injury severity refers to the average severity of injury sustained, which was calculated by dividing the time missed due to injury by the number of injuries that an athlete sustained in the season. Average Number of Sessions Missed refers to the average number of total sessions a player missed due to injury (i.e., the number of training sessions missed added to the number of games missed).

Table 6 indicates that, for the sample as a whole, 2.97 games on average were missed in the season, and 4.24 training sessions giving a total time missed due to injury of 7.19 sessions in a season. Average injury severity across the group was 4.18. Footballers missed the most sessions on average out of the three sports, as well as having the highest average injury severity. Although rugby players on average missed fewer games and overall sessions than hockey players, they displayed a higher average injury severity than hockey players (3.85 as opposed to 3.47).

Wellbeing.

The wellbeing results are tabulated below in Table 7, showing scores for Wellbeing, Flourishing, Resilience and Health and Lifestyle

Table 7.

Measures of Wellbeing

Sport	Wellbeing	Flourishing	Resilience	Health/Lifestyle
Rugby	70.41 (9.7)	81.5 (7.27)	71.35 (12.96)	72.97 (12.96)
Hockey	69.63 (13.12)	79.38 (11.76)	74.83 (14.26)	72.96 (11.42)
Football	72.38 (9.57)	80.92 (12.25)	72.65 (11.92)	68.62 (11.97)
All Sports	70.98 (10.52)	80.74 (10.46)	72.74 (12.68)	71.27 (12.19)

Note. All values represent mean (s.d.)

All wellbeing variables were very similar across the three sports, with no individual outcome differing from the mean by more than 2 units for any variable.

Character Strengths.

The average character strength score for all participants are shown below in Table 8, along with averages for each sport and national data for New Zealand and the US taken from Park, Peterson and Seligman (2004).

Table 8.

Average Character Strength Scores for the Sample

Strengths	Total Sample	Rugby	Hockey	Football	NZ National	US National
Appreciation of Beauty	3.40 (.69)	3.22 (.73)	3.37 (.66)	3.58 (.77)	3.81	3.76
Bravery	3.67 (.46)	3.74 (.44)	3.56 (.40)	3.67 (.50)	3.66	3.67
Creativity	3.81 (.49)	3.66 (.51)	3.9 (.49)	3.90 (.70)	3.78	3.75
Curiosity	3.90 (.47)	3.81 (.43)	3.97 (.47)	3.95 (.51)	4.01	3.86
Fairness	4.01 (.73)	4.00 (.49)	4.01 (.51)	4.03 (.49)	3.98	3.98
Forgiveness	3.64 (.52)	3.53 (.59)	3.71 (.62)	3.70 (.62)	3.65	3.65
Gratitude	3.55 (.77)	3.46 (.37)	3.40 (.73)	3.71 (.72)	3.77	3.94
Honesty	4.14 (.46)	4.07 (.51)	4.19 (.49)	4.18 (.49)	3.90	3.98
Hope	3.75 (.55)	3.62 (.55)	3.86 (.57)	3.78 (.67)	3.56	3.61
Humility	3.34 (.66)	3.28 (.67)	3.23 (.80)	3.46 (.62)	3.32	3.46
Humour	4.21 (.74)	4.10 (.46)	4.43 (.42)	4.18 (.56)	3.68	3.87
Judgment	3.98 (.48)	3.88 (.63)	3.88 (.61)	4.14 (.50)	4.00	3.91
Kindness	4.10 (.70)	4.03 (.40)	4.02 (.45)	4.22 (.51)	3.90	3.99
Leadership	3.93 (.59)	3.92 (.47)	4.03 (.42)	3.87 (.61)	3.72	3.71
Love	3.84 (.61)	3.73 (.64)	3.92 (.55)	3.9 (.82)	3.82	3.87
Love of Learning	3.29 (.56)	3.28 (.76)	3.15 (.88)	3.39 (.71)	3.92	3.67
Perseverance	3.77 (.50)	3.73 (.55)	3.75 (.56)	3.81 (.56)	3.56	3.59
Perspective	3.79 (.61)	3.71 (.58)	3.83 (.55)	3.86 (.55)	3.73	3.74
Prudence	3.35 (.56)	3.23 (.64)	3.24 (.98)	3.55 (.58)	3.41	3.47
Self-Regulation	3.19 (.86)	3.15 (.67)	3.15 (.77)	3.26 (.59)	3.30	3.27
Social Intelligence	3.85 (.49)	3.87 (.50)	3.88 (.48)	3.82 (.68)	3.70	3.74
Spirituality	2.40 (.54)	2.41 (.85)	2.07 (.72)	2.61 (.93)	3.23	3.55
Teamwork	3.84 (.63)	3.76 (.46)	3.94 (.49)	3.84 (.48)	3.62	3.68
Zest	3.69 (.58)	3.64 (.50)	3.81 (.50)	3.66 (.60)	3.57	3.48

Note. All values represent mean (s.d.). Data for the NZ national sample and US national sample provided by Park, Peterson and Seligman, 2006.

For the total sample, Table 8 reveals that humour, honesty, kindness, fairness and judgement were the most highly endorsed strengths. The majority of the scores fell between 3.00 and 4.00, with notable exceptions being spirituality, scoring 2.4 overall (2.41 for rugby, 2.07 for hockey and 2.61 for football). For the national NZ sample, curiosity, judgement, fairness and love of learning were the four highest ranked strengths, whilst kindness, honesty, fairness and gratitude were the four strongest strengths in the US sample.

Table 9 shows the rankings of character strengths, in terms of highest endorsement of a particular strength, for the total sample, and how the rankings of strengths within the

individual sports samples compare to each other and to NZ and US national samples provided by Park, Peterson and Seligman (2004)

Table 9.

Comparative Ranks of Strengths

Strength	Sample Rank	Rugby Rank	Hockey Rank	Football Rank	NZ National Data	US National Rank
Humour	1	1	1	2	14	7
Honesty	2	2	2	3	6	3
Kindness	3	3	4	1	5	1
Fairness	4	4	5	5	3	2
Judgment	5	6	10	4	2	5
Leadership	6	5	3	9	12	13
Curiosity	7	8	6	6	1	8
Social Intelligence	8	7	11	12	13	12
Teamwork	9	9	7	11	17	14
Love	10	11	8	8	2	6
Creativity	11	14	9	7	9	10
Perspective	12	13	13	10	11	11
Perseverance	13	12	15	13	20	19
Hope	14	16	12	14	19	18
Zest	15	15	14	18	18	21
Bravery	16	10	17	17	15	16
Forgiveness	17	17	16	16	16	17
Gratitude	18	18	18	15	10	4
Appreciation of Beauty	19	22	19	19	8	9
Prudence	20	21	20	20	21	22
Humility	21	20	21	21	22	23
Love of Learning	22	19	22	22	4	15
Self-Regulation	23	23	23	23	23	24
Spirituality	24	24	24	24	24	20

There were broad similarities observed in the rankings of strengths from most endorsed to least endorsed between the sports. Humour, honesty and kindness were ranked in the top 3 for rugby and football, with kindness ranked fourth for hockey, whilst Self-regulation and spirituality were ranked the 23rd and 24th least endorsed strengths for all sports, respectively. The largest difference between rankings across sports was found to be bravery, which, while ranked 10th by rugby players, was ranked 17th by footballers and hockey

players. When comparing the average sample rank with the NZ national sample collected by Park, Peterson & Seligman (2006), larger differences between rankings were noted. Humour was ranked 13 places higher by the sample when compared to a national sample (1 compared to 14), leadership six places higher (6 compared to 12), teamwork 8 places higher (9 compared to 17), perseverance 7 places higher (13 compared to 20), whilst love was rated 8 places lower by the sample in this study compared to a national sample (10 compared to 2), gratitude 8 places lower (18 compared to 10), appreciation of beauty and excellence 11 places lower (19 compared to 8) and love of learning 18 places lower (22 compared to 4). Both the national sample, the total study sample and the individual sport samples ranked self-regulation and religiousness 23rd and 24th respectively. The US sample was fairly similar to the NZ sample, with the main differences being humour rated 7 places higher in the US than in NZ, curiosity (the number one ranked strength for NZ) ranked 8 by the US, and love of learning, ranked 4 in NZ but 15 by the US.

Hypothesis Testing.

Bivariate correlations were calculated to look for relationships between injury data and the personality and wellbeing measures. Table 10 shows the significant relationships that were observed between the character strength scores and wellbeing outcomes for all athletes, correlated with injury outcomes.

Table 10.

Correlations Between Injury Data and Strength and Wellbeing Outcomes (n=95)

	Number of Injuries	Games Missed	Training Sessions Missed	Total Sessions Missed	Injury Severity	Humour	Kindness	Leadership	Spirituality	Health Lifestyle
No. of Injuries										
Games Missed	.615**									
Training Sessions Missed	.700**	.860**								
Total Sessions	.684**	.956**	.972**							
Injury Severity	.256*	.749**	.739**	.770**						
Humour	.273**	.211*	.184	.203*	.062					
Kindness	.183	.208*	.234*	.228*	.153	.425**				
Leadership	.279**	.232*	.187	.213*	.083	.102	.394**			
Spirituality	-.003	.192	.197	.204*	.264**	-.024	.218*	.084		
Health/Lifestyle	-.099	-.244*	-.170	-.212*	-.196	.234*	-.014	-.081	.036	

Note. * $p<.05$, ** $p<.01$.

The injury outcomes were all highly correlated with each other. The number of injuries sustained in a season correlated positively with humour and leadership, which were both significant at $p<.01$. Humour and leadership were also correlated positively with games missed and total sessions missed, both at $p<.05$. Health and lifestyle was negatively correlated with games missed and total sessions missed, significant at $p<.05$.

To test for differences between the mean scores of all outcomes across the three sports, One-Way ANOVA was carried out, with Bonferroni post-hoc testing. There was a statistically significant effect of sport on humour, $F(2,92) = 3.224$, $p = .044$. Bonferroni post hoc testing showed that hockey players on average scored .326 lower than rugby players in humour, a difference that was statistically significant ($p=.045$). There was no statistically significant difference between rugby and football players ($p=.100$) or football and hockey players ($p=.171$). There were no significant differences between the other 23 mean character strength scores or the four Wellbeing outcomes across participants in the three groups. ANOVA results also indicated that there were no significant differences in injury rates, severity or sessions missed due to injury between sports.

To test whether any character strengths or wellbeing outcomes could predict continuous injury outcomes for the total population, linear regressions were carried out with each strength and wellbeing measure as a predictor of games missed, training sessions missed, total sessions missed and injury severity. Humour, Leadership and Health and lifestyle were found to predict number of games missed due to injury, Table 11 show the results of the regressions carried out.

Table 11.

Predictors of Games Missed due to Injury

		Unstandardized Coefficients				
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	-3.023	2.394		-1.263	.210
	Humour	1.175	.563	.211	2.087	.040
Model 2	(Constant)	-2.988	2.159		-1.384	.170
	Leadership	1.252	.544	.232	2.301	.024
Model 3	(Constant)	5.929	1.666		3.559	.001
	Health Lifestyle	-.056	.023	-.244	-2.432	.017

Note. R^2 for model 1 = .045; Model 2 = .054; Model 3 = .06

A one unit change in humour resulted in a 1.175 increase in games missed across the total population. Similarly, a one unit increase in leadership resulted in a 1.252 increase in games missed, whereas a one unit increase in health and lifestyle results in a .05 decrease in games missed.

Regression analysis revealed that no character strengths or wellbeing outcomes were related to training sessions missed, however humour, leadership and health and lifestyle were significantly associated with the total number of sessions missed due to injury across the sample. Table 12 represents the results of these regressions.

Table 12.

Predictors of Total Sessions Missed due to Injury

		Unstandardized Coefficients				
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	-5.502	5.141		-1.070	.287
	Humour	2.417	1.210	.203	1.997	.049
Model 2	(Constant)	-4.983	4.649		-1.072	.287
	Leadership	2.460	1.171	.213	2.100	.038
Model 3	(Constant)	12.132	3.599		3.371	.001
	Health Lifestyle	-.104	.050	-.212	-2.097	.039

Note. R^2 for model 1 = .041; Model 2 = .045; Model 3 = .045

A one unit increase in humour was associated with a 2.417 increase in the number of total sessions missed due to injury, whilst a one unit increase in leadership resulted in a 2.46 unit increase in the total number of sessions missed due to injury. Furthermore, a one unit increase in health and lifestyle was significantly associated with a .104 decrease in the number of sessions missed due to injury.

Linear regression testing for number of injuries indicated that leadership and humour were significant predictors of the number of injuries sustained in the season. These results are outlined in Table 13 below.

Table 13.

Predictors of Number of Injuries Sustained

		Unstandardized Coefficients				
		B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	-1.624	1.028		-1.579	.118
	Humour	.662	.242	.273	2.734	.007
Model 2	(Constant)	-1.416	.930		-1.522	.131
	Leadership	.657	.234	.279	2.801	.006

Note. R^2 for model 1 = .74; R^2 for model 2 = .78

The results in Table 13 indicate that for the total sample, a one unit increase in humour was associated with a .662 increase in the number of injuries sustained during the season, whilst a one unit increase in leadership was significantly related to a .657 increase in the number of injuries.

To test for character strengths and wellbeing relating to the likelihood of being injured or not between the three sports, a binary logistic regression was carried out for each outcome. No tests showed any significant relationship between character strengths or wellbeing and whether an athlete got injured or not. This was repeated without controlling for sport, but also indicated no significant relationships between character strengths and wellbeing for the sample as a whole.

Multinomial logistic regression was then used to investigate whether any outcomes could be used to predict differing numbers of injuries, between athletes of different sports. Injury was split into 3 categories, No Injury (*n*=34), 1 Injury (*n*=30) or 2 or More Injuries (*n*=31). No strengths or wellbeing outcomes were significant predictors of injury, however the strengths which most closely approached the threshold for significance was bravery. The results from these logistic regressions are shown below.

Table 14.

Model Fitting Information for Leadership and Bravery

			Likelihood Ratio Tests		
		-2 Log Likelihood	Chi-Square	df	Sig.
Bravery	Intercept Only	121.730			
	Final	110.549	11.182	6	0.083

Table 15.

Multinomial Logistic Regression for Bravery and Leadership

Bravery			95% CI for Odds Ratio			
		b(SE)	Lower	Odds Ratio	Upper	Sig.
1 Injury vs. No Injury						
	Intercept	-1.537 (2.1)				0.464
	Bravery	0.534 (.577)	0.55	0.55	5.29	0.355
	Rugby	-1.082 (.609)	0.10	0.10	1.12	0.076
	Hockey	-0.339 (.666)	0.19	0.19	2.63	0.611
	Football*	0				
2 or More Injuries vs No Injuries						
	Intercept	-4.773 (2.357)				0.043
	Bravery	1.441 (.633)	1.220	4.223	14.615	0.023
	Rugby	-1.433 (.629)	0.069	0.239	0.819	0.023
	Hockey	-.383 (.676)	0.181	0.682	2.563	0.571
	Football*	0				

Note. This parameter is set to zero as it is the reference sport.

Whilst the overall models are insignificant at $p \leq .05$, the results from the logistic regression suggest that a one unit increase in bravery for rugby players, when compared to football players was significantly associated ($p = .023$) with an odds ratio of .239. As bravery increased, rugby players were less likely than footballers to get injured twice or more in a season compared to the odds of not getting injured at all.

Chapter 5. Discussion

The primary aims of this research were to investigate whether there was any relationship between character strengths, wellbeing and injury, in a sample of recreational athletes. A secondary goal was to test character strengths in recreational athletes, and assess whether there were differences between this sample and national data provided by Park, Peterson and Seligman, 2006. The hypotheses, restated here, were four-fold.

Hypothesis 1. Zest, bravery, curiosity and hope would be associated with more injuries and greater time missed from sport. This was not supported in the results, with both linear and logistic regressions being non-significant. Of the other character strengths tested, leadership and humour were significantly correlated with an increase in the number of injuries and number of sessions missed due to injury.

Hypothesis 2. Prudence would be related to fewer injuries and missing fewer sessions. There was no evidence supporting this hypothesis in the results, with regressions indicating that prudence was not significantly associated to any decrease in injury or time missed from sport.

Hypothesis 3. Athletes with higher wellbeing would suffer fewer injuries than those with lower wellbeing. While wellbeing was not observed to be related to any injury outcome, health and lifestyle was found to be a significant predictor of total sessions missed due to injury.

Hypothesis 4. There would be no major differences between character strength profiles observed between the athletes of different sports, or between the athletes as a whole and the general public. This hypothesis was partially confirmed, with no large differences in ranking noted between the sports, however there were large differences in ranking of

strengths between the sample and rankings reported in previous literature using a large national sample.

Character Strengths and Injury

The first and second hypotheses regarding character strengths, predicting higher or lower chances of injury, were largely unsupported by the results. Binary logistic regression indicated that no strengths predicted a greater chance of being injured versus being uninjured, whilst multinomial logistic regression suggested that no character strengths predicted varying numbers of injuries across the sports at $p<.05$. Approaching this significance level were the strengths of leadership and bravery ($p=.073$ and $p=.083$ respectively), however these models only appeared to be significant when comparing the two or more injury category to the no injury category. Furthermore, the significant odds ratios suggested that as bravery increased, the odds of being injured twice or more in a season decreased, but only in rugby players when compared to football players. It was hypothesized that bravery would be associated with an increased chance of being injured, while this result appears to suggest the opposite.

Of interest were bivariate correlations and linear regressions carried out to test for any predictors of injury over the total sample. Humour and leadership were observed to be significantly positively correlated with the number of injuries sustained, number of games missed and number of total sessions missed due to injury. Linear regressions were carried out to investigate the relationship between leadership, humour and injury (along with other variables). Humour and leadership were found to significantly predict the number of injuries sustained, the number of total sessions missed due to injury and the number of games missed due to injury. These findings are of interest as they provide some tentative evidence to support a relationship between specific character strengths and injury, however the lack of any significant logistic regressions means these results should be interpreted with caution.

Furthermore, R^2 values for leadership and humour were low, indicating that these variables only explained a small portion of the total variance. It is possible that leadership and humour are part of a 'personality profile' which is more susceptible to injury. In his 2000 review of the topic however, Junge found that there was little evidence supporting the concept of a personality profile for an injury prone athlete. This review predominantly examined the traits of injured athletes compared to non-injured athletes, without assessing whether particular traits predisposed or increased the likelihood of athletes to actually become injured. It may therefore be the case that certain personality traits may cause an athlete to be more susceptible to injury, which may not be directly identifiable when simply comparing the traits of injured versus non-injured athletes. Junge (2000) acknowledges this, and notes that several studies suggest a link between readiness to take risks and injury. A possible explanation for the apparent relationship of leadership to injury in this study, in light of Junge's (2000) reference to risk taking, is that participants who score highly in leadership may put themselves in harm's way on the sports field more often due to greater effort, motivation or commitment to their sport. This level of commitment and/or motivation might manifest itself through engaging in behaviour on the sports field that might be considered high risk, which could be expected to result in more injuries and more sessions missed due to injury (a one unit increase in leadership was associated with a 1.2 increase in games missed and a 2.4 increase in total sessions missed).

Leadership as a character strength has not been studied extensively within the literature, however leadership as a generic trait has been researched considerably, especially within the context of sport and business. Most of this research in sport has focused on athletes' perception of their coach's leadership, and how leadership traits can affect performance (Charbonneau, Barling & Kelloway, 2001; Garland & Barry, 1988). Peterson and Seligman (2004) characterise 'leadership' along the lines of the style of leadership

known as transformational leadership. Transformational leadership, first espoused by Tichy and Devanna (1986), refers to leaders who challenge the current status quo and encourage people within their organisation to creatively come up with a new vision. Research in this area by Charbonneau and colleagues (2001) discusses the role of transformational leadership in motivation and sports performance. Charbonneau et al. observed that in college athletes from a variety of sports, transformational leadership was associated with increased performance in sports, a relationship which was mediated by intrinsic motivation. Charbonneau et al. define intrinsic motivation as engaging in activities for their own sake and not for a physical or external reward. Apart from acting as a mediator, intrinsic motivation was also observed to be directly and significantly influenced by transformational leadership, such that athletes who scored higher in leadership also scored higher in motivation. This suggests that not only do transformational leaders perform better at their sport, they are likely to exhibit higher intrinsic motivation. This relationship between leaders displaying higher motivation is supported in both sports and business. Price and Weiss (2011) observed a positive correlation between leadership behaviours and intrinsic motivation in female soccer players, whilst Barbuto (2005) noted a similar positive correlation across a large sample of business organisations, where leadership and intrinsic motivation were positively associated with each other.

While there is evidence to support a relationship between transformational leadership and intrinsic motivation, there is less research connecting intrinsic motivation to risk taking behaviour, despite intrinsic motivation itself having been studied in athletes reasonably extensively (Cerasoli, Nicklin & Ford, 2014). The relationship between motivation and risk taking was first suggested by Atkinson (1957) and subsequent research supported this notion in athletes (Hamilton, 1974). Dewett investigated the link between intrinsic motivation and risk taking in a business setting and observed a significant positive correlation between the

two, as well as finding that willingness to take risks was significantly influenced by intrinsic motivation. Another study (Shin & Eom, 2014) investigated Korean workers' transformational leadership and risk taking norms, and observed a strong positive correlation between the two variables, which was highly significant. This study also included a motivation measure, however this referred to the motivation of the work team, rather than individual intrinsic motivation.

To summarise the above literature, there is evidence to support the notion that individuals who score highly in leadership tend to display higher intrinsic motivation than others in sport, as well as research suggesting a link between high intrinsic motivation and risk taking behaviour, at least in a business setting. If athletes who scored highly in leadership were more highly intrinsically motivated, and this manifested in increasing risk taking behaviour (such as attempting dangerous plays) it follows that these athletes would likely sustain more injuries than fellow athletes who were not as committed. The concept that athletes who engage in risk taking on the sports field would sustain more injuries has been theorized for several years (Williams & Andersen, 1998), however a study on female soccer players aged between 11 and 14 did not provide evidence to support this (Kontos, 2004). Kontos (2004) used a very different sample to this study (male and over 18) and so these findings may or may not be of direct relevance here. Furthermore, Junge's (2000) review reported that injured athletes (when compared to non-injured athletes) were found to be "enterprising" (Hamilton et al., 1989), "adventurous" (Taimela, Kujala & Osterman, 1990) and display a lack of caution (Lysens et al., 1989). These traits are labelled by Junge (2000) as indicating a 'readiness to take risks', which might predispose athletes to injury. As such, there is literature to support each step of the suggested mechanism to explain the finding that athletes who score highly in measures of leadership sustain more injuries than those who score lower.

It is more difficult to theorise which mechanism could be responsible for the finding that humour was related to an increased number of injuries and sessions missed due to injury, and the possibility exists that this finding is an artefact. A possible explanation as to why players high in humour get injured more often could be that humour in our sample was related to leadership. Leaders who use humour or are considered humorous have been rated as better or more effective leaders by their subordinates (Grisaffe, Blom & Burke, 2003; Priest & Swain, 2002), as well as humour being found to moderate the effect of a leader on performance in subordinates (Avolio, Howell & Sosik, 1999). Leadership and humour outcomes were not significantly correlated in our sample, and there is little evidence investigating humour as an antecedent to injury in an athletic context, however given the aforementioned studies in business settings, it might not be unreasonable to suggest that a connection exists between humour and leadership, especially since the sports involved in this study were team sports, where humour might be viewed as a positive and desirable trait (Snyder, 1991). If this were the case, it may explain why humour was associated with injury in our sample.

To understand how leadership might affect injury rate in athletes, the Integrated Model of Injury (Wiese-Bjornstal et al., 1998) could be used. If the assumption is made that players who are high in leadership are more highly motivated, and therefore more likely to take risks on the playing field, it is arguably apparent how this might affect the antecedents to injury in the Integrated Model. Leadership could affect the pre-injury factor ‘history of stressors’, in that if athlete leaders get injured more often they will have a greater history of injury related stressors. Furthermore, situational factors and personal factors, the key components of the cognitive appraisal of the injury, might also be impacted by high leadership scores. Athletes who score highly in leadership and are more intrinsically motivated might be under high expectations from coaches and team-mates (situational

factor), have a long injury history, as well as being competitive, driven sportspeople (personal factors), all of which could combine to produce a more negative cognitive appraisal of a certain injury in players who are high in leadership. Athletic identity could also contribute to personal factors which might lead to an even more negative cognitive appraisal, since the athlete might consider their sport and their participation in it as central to their identity. If these factors combine as theorised to produce negative cognitive appraisals in high-leadership athletes, the Integrated Model suggests that this would lead to negative recovery outcomes, which could leave the athlete predisposed to future injury, through an even more negative history of stressors and injury history. If this were to be the case, a positive feedback loop could occur, wherein athletes who score highly in leadership get injured and are predisposed to form a negative cognitive appraisal of their injury and do not recover as well as athlete who were not as high in leadership. This 'high-leadership' athlete would then be increasingly susceptible to future injury or re-injury through their 'history of stressors' which they might not recover effectively from. This would then further increase their chances of sustaining new injuries or re-aggravating previous injuries. Research has shown that athletes who have suffered just one injury were 2.6 times more likely to get injured again during the same season in youth football, and players who had received two or more injuries were three times more likely to get injured during the season, (Kucera, Marshall, Kirkendall, Marchak & Garrett, 2005). Another study which assessed elite footballers suggested that players injured in the previous season were 2.7 times more likely to sustain an injury the following season than players who had not (Hägglund, Waldén & Ekstrand, 2006). This process might explain why athletes high in leadership experienced more injuries and missed more sessions than those who were not. The figure below illustrates this hypothetical relationship.

Figure 5.

Leadership, Motivation, Risk Taking and its Relationship to Injury

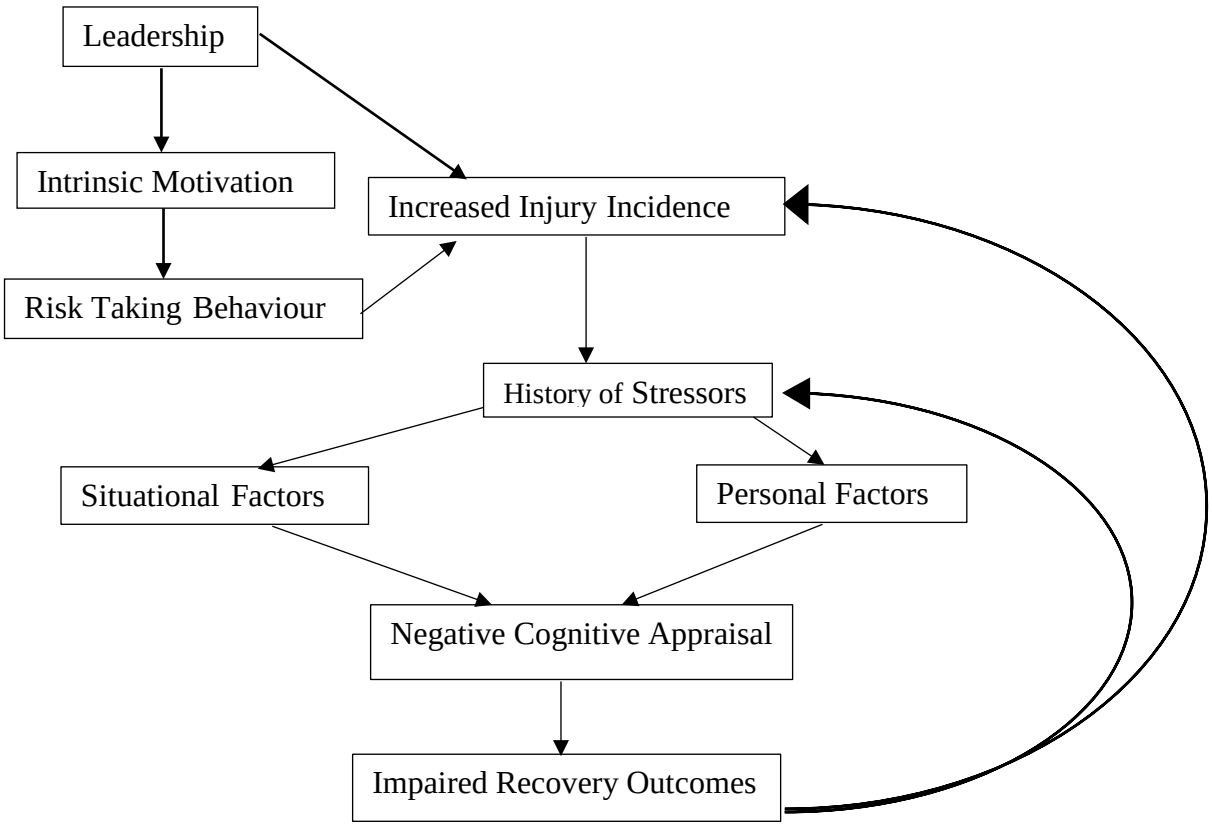

Figure 5. Displays the hypothesized mechanism by which athletes who score highly in leadership sustain more injuries than those lower in leadership.

Wellbeing and Injury

It was hypothesized that athletes with higher wellbeing would sustain less injuries than athletes who did not, however this hypothesis was not supported in the results. It is possible that rather than wellbeing being a predictor of injury, injuries are a predictor of wellbeing, since evidence suggests upon suffering an injury, athletes suffer increased negative affect and lower wellbeing, at least in the short term (Tracey, 2003).

Of the other three measures included in the wellbeing inventory, neither flourishing nor resilience predicted injury incidence or rate. The fourth wellbeing outcome, however, health and lifestyle, significantly predicted the number of games missed due to injury, and the number of total sessions missed due to injury, such that a 10 unit increase in health and

lifestyle was associated with a 1.04 decrease in total sessions missed, suggesting that healthier athletes missed less sessions. This is particularly interesting since the standard deviation for the total sample in this measure was 12.19, indicating that less than one standard deviation of difference in this measure resulted in a difference of one missed session. The measure of health and lifestyle was a newly developed measure for the Work on Wellbeing survey, and consisted of four questions assessing participant satisfaction with diet, exercise levels, sleep and overall health, and has been used previously in a study assessing a large sample of the NZ population (Jarden et al., 2013), finding that participants who scored highly in this measure were significantly more likely to exhibit high wellbeing.

It appears logical that athletes with poorer health and lifestyle would miss more sessions from their sport. Previous literature using self-rated health as a predictor indicates that it has been regularly linked to mortality in the elderly (Idler & Angel, 1990; Mossey & Shapiro, 1982). This would suggest that despite the measure being self-rated, when individuals have a poor view of their own health, they are likely correct, which is revealed through high mortality rates. Few studies have assessed self-rated health in athletes, with research indicating an association between psychological distress and self-rated health (Verger, Guagliardo, Pruvost & Peretti-Watel, 2006), whilst another study linked family structure (specifically single parent families), alcohol bingeing and smoking to poorer self-rated health (Vingilis, Wade & Seeley, 2002). It is important to note that our data only links health and lifestyle to the amount of sessions missed due to injury, and not to the number of sporting injuries sustained, however given the evidence above, athletes who scored lower in health and lifestyle measures might have been suffering from psychological distress that wasn't assessed by the survey used in this research, or might have been partaking in the behaviours such as alcohol bingeing which negatively affected the health measure. If this were the case, it might be expected that these athletes would miss more time from their sport

than other athletes due to their poor health, which might stem from any of the predictors mentioned above. Equally, these factors could also contribute to the Integrated Model of Injury (Wiese-Bjornstal, 1998). Whilst there was no significant association between number of injuries and health and lifestyle, if these athletes were to sustain an injury, they would be more likely to form a negative cognitive appraisal. This might be due to psychological distress and/or alcohol abuse (personal factors), as well as the pre-injury factors of coping resources or history of stressors, either of which could be impacted by a family structure such as a single parent family.

Character Strength Comparisons

The data from this study allowed a comparison of character strengths between the different sports within our sample, as well as between our sample and national data for New Zealand and the United States provided by Park, Peterson and Seligman (2006). It was hypothesized that there would be no significant differences between the sports in character strengths, on the basis that evidence from Park, Peterson and Seligman (2006) suggested that character strengths are reasonably ubiquitous and uniform across countries and cultures, so it was not expected that this study would observe differences between individuals who played a different sport. This hypothesis was confirmed, with the only statistically significant difference observed in character strengths between sports being in humour in hockey players and rugby players. Given that this was the only statistically significant difference observed, and there was only a significant difference between two of the three sports (football was not significantly different to hockey), it is possible that this case was an artefact in the data, rather than solid evidence suggesting a difference in levels of humour between players of different sports. Table 11 shows the difference in rankings between the sample in this study, and national data from New Zealand and the United States. The difference in ranking was calculated by subtracting the study's sample rank from the NZ or US samples' rank, with

positives and negative indicating a higher or lower ranking by the study sample than the national sample.

Table 16.

Comparison of Strength Rankings Between Sample and National Data

Strength	Sample Rank	Difference Between Sample and NZ Rank	Difference between Sample and US Rank
Humour	1	13	6
Honesty	2	4	1
Kindness	3	2	-2
Fairness	4	-1	-2
Judgment	5	-3	0
Leadership	6	6	7
Curiosity	7	-6	1
Social Intelligence	8	5	4
Teamwork	9	8	5
Love	10	-8	-4
Creativity	11	-2	-1
Perspective	12	-1	-1
Perseverance	13	7	6
Hope	14	5	4
Zest	15	3	6
Bravery	16	-1	0
Forgiveness	17	-1	0
Gratitude	18	-8	-14
Appreciation of Beauty	19	-11	-10
Prudence	20	1	2
Humility	21	1	2
Love of Learning	22	-18	-7
Self-Regulation	23	0	1

Note. Positive and negative indicate the difference between the sample and the relevant national data, such that "5" indicates the sample ranked this strength 5 places higher than the relevant national sample, whilst "-3" indicates the sample ranked this strength 3 places lower than the relevant national sample.

On the whole, the sports did not largely differ from each other in terms of ranking of strengths. The largest difference between sports was the difference in ranking of bravery. Rugby players ranked bravery their 10th most endorsed strength, whereas both footballers and hockey players ranked it 17th. A possible explanation for this might be the more physical nature of rugby when compared to hockey and football, and as such the trait of bravery might be admired or endorsed to a greater extent in rugby than in the other sports. Qualitative evidence exists suggesting that bravery is a valued trait in the role models of young rugby players (Fleming, Hardman, Jones & Sheridan, 2005). Given the stable nature of character strengths, it is possible that individuals who are high in bravery gravitate towards collision sports such as rugby as their own character strength profile will be valued to a greater extent by team mates than in sports where bravery is not as highly valued.

When the study sample was compared to data from the New Zealand national sample, the majority of the character strengths were ranked differently. Only self-regulation and spirituality were ranked exactly the same between the study sample and the NZ national sample, being ranked 23rd and 24th respectively. The average difference in ranking between the study sample and the national sample in absolute terms was 4.8. This seems to suggest that there was some disagreement between this sample and the national sample as to the ranking of strengths. The largest differences for individual strengths were observed between the rankings of love of learning and humour. Love of learning was highly endorsed by the NZ national sample, being ranked 4th overall, however this strength was ranked 22 (out of 24) by the study sample. Humour was the number one most endorsed strength for the athlete sample but was ranked 14th by the national sample. The apparent disregard for love of learning is slightly difficult to interpret as it might be expected that individuals who choose to play a sport recreationally would be interested in learning and bettering themselves, in the hope this could improve their sporting performance. The finding that humour was valued to a greater

extent by the study sample than in the national sample is less unexpected. Since all athletes in our sample came from team sports, working together with other people is a key element to performing at any level in these sports. As such, humour might be a valuable trait for an athlete looking to integrate and function well as part of a team. A self-selection bias may form, whereby individuals who do not value humour highly might gravitate towards individual sports or attempt to play team sports but find it not to their liking. Snyder (1991) reviews the topic of humour in sport, and observes that it can be a useful social integrator, a method to increase cohesion and promote solidarity, as well as providing comic relief during trying circumstances. Snyder also refers to humour as a tool to enhance the self-esteem of oneself and one's team mates through disparaging rivals, and suggests that humour is valuable to team sports as a method of differentiating in-groups and out-groups, via insulting members of the out-group. Aggerholm and Ronglan (2012) also discuss the value of humour in football and handball. They state that humour helps to provide structure and balance to the social training environment, which in itself might lead to more effective training sessions and thus better performance, as well as linking humour and creative game performance. These sources indicate that humour is a valuable trait in members of team sports, and particularly athletes who play invasion games (rugby, hockey and football all meet these criteria), a concept which was supported by evidence from our study.

When our sample was compared to the data from the US sample, there were smaller deviations in ranking. The largest discrepancy was observed in the ranking of gratitude at 18th by our sample but 4th in the US sample. The ranking of appreciation of beauty and excellence was also ranked 10 places lower in our sample than by the US sample (19th and 9th respectively). The average difference in rank between our sample and the US sample was 3.75, suggesting our sample more closely mirrored the endorsement of strengths by individuals from the United States than in New Zealand itself. This is slightly surprising

given our sample was almost exclusively made up of local New Zealanders, however it supports the notion that individuals who play recreational team sports in New Zealand do in fact differ in character strength profile from the general public, and might more closely align with individuals from the US.

Sporting Injury

In this study, 62 out of 95, or 65%, athletes suffered an injury during the season (18/34 or 53% for rugby, 16/24 or 67% for hockey and 28/37 or 76% for football). In the literature, rugby injury incidence when measured in this way has been observed as high as 72% of players receiving an injury (Bird et al., 1998). Evidence in elite football suggests players get injured even more often, with each player on average suffering two injuries per season, giving a rate of 200 injuries per 100 athletes (Ekstrand, Hägglund & Walden, 2009). There are several possible explanations for the disparity between our injury rates and those found in relevant literature. Firstly, the football injury figure comes from an elite sample playing a high number of games (there are 38 games in a single English Premier League season), and so this study had both a much larger sample and a longer data collection period, together with players training much more frequently and to a higher level than our sample. For rugby, our data was not as dramatically different from the previous literature, and differences between the two results might be due to sample size differences, as our study included only 34 rugby players whereas Bird and colleagues (1998) had a large sample of 356 amateur rugby players. Furthermore, Bird et al. assessed injury close to 20 years before the present study, and it is possible that injury incidence has changed in that time due to different training techniques or modes of playing. Of interest is the work of Junge, Cheung, Edwards and Dvorak (2004), who found that young footballers got injured less often than rugby players, which was not observed in this study. The difference in age of the participants in this study and Junge et al.'s work could account for this, as it is possible that younger football players get injured less

often than older players, whilst rugby injury rates remain stable possibly due to the high impact collisions that take place at all levels. It is difficult to draw comparisons between hockey injury rates in our sample and others, since most studies tend to focus on female participants rather than males, however the figure of 67% players sustaining an injury that was observed in this study is reasonably close to that of Murtaugh (2001), who observed 74 out of 100 hockey players suffer at least one injury over the course of the season.

It is possible that differences between injury incidence in our study and previously published literature stem from the different measurement of injury used in this study. While 'injuries per 1000 player hours' might be considered the gold standard for measuring injury incidence, this method could not be feasibly or accurately applied to this study. If this measurement had been utilized, it is possible that there would not be such a discrepancy between our data and other studies, however it should be noted that even within established literature there is disagreement on what exactly the incidence of injury might be within sports. In their review of the topic, Dvorak and Junge (2000) refer to studies listing football injury incidence ranging from as low as 7.4 injuries/1000 player hours to 37.2 injuries /1000 player hours. Similarly, a review on injury prevalence in rugby union (Williams, Trewartha, Kemp & Stokes, 2013) observed injury incidence in games ranging from 27 injuries/1000 players hours to as high as 218 injuries/1000 player hours. This raises the question of the validity of comparing injury incidence across studies. It is highly likely that there are large differences between injury incidence between every level of sport, as well as between countries where the sport is a national sport compared to a minor sport, as well as national differences in general. Furthermore, both Dvorak and Junge (2000), and Williams et al. (2013), note large differences between incidence of injury during training and games, introducing another question of whether an accurate, valid and reliable overall injury rate for a sport is really attainable. It would seem that generalising results from injury incidence

studies is not currently possible, and therefore the results of this study should be used to provide guidance on an expected injury rate for this specific sample only (competitive, amateur athletes from Auckland, New Zealand).

Limitations

There were some limitations associated with this research, some of which were unavoidable due to the study design. Due to the design of this study, as well as logistic and practical restraints, injury could only be measured through self-report from the athletes, and in terms of either a binary measure of injured versus not injured, and number of injuries sustained. The consequence of this is a chance of recall bias or inaccuracy, however research suggests that there is reasonable validity in self-reporting injury data by athletes. When athletes were asked to recall whether or not they had sustained an injury and how many injuries they had sustained, they were reliable both after four weeks (Valuri, Stevenson, Finch, Hamer & Elliot, 2005) and 12 months (Gabbe, Finch, Bennell & Wajswelner, 2003). Furthermore, due to being unable to measure injury incidence in real time, neither established units of injury incidence (injuries per 1000 hours of exposure), nor differentiation between training and game injuries, could be used. This might have provided more detailed insight into trends in injuries. Another issue with the measurement of injury in this study was the lack of information regarding the type of injury sustained, or where the injury was located (i.e. ankle sprain, back injury etc.). The decision to not collect information on the nature of individual injuries was taken due to research suggesting that athletes could not accurately recall where they had been injured (Gabbe et al., 2003). Another issue which arose from practical constraints were the maximum sample size which could be recruited due to the aforementioned constraints. Due to the nature of the club sport system in Auckland, sports clubs were either not willing or not able to provide contact information for registered players, and so recruitment had to be carried out in person, and teams which met the inclusion criteria

had to be personally sourced by the researcher. Studies that have investigated injury in athletic populations have used between several hundred and several thousand participants, ranging in duration from one season to several seasons (Brooks et al., 2005; Hootman et al., 2007; Junge et al., 2004), and so there is a chance that the sample size in this study was too small to detect small or subtle effects. This could potentially explain why simple linear regressions were significant, but more robust logistic regressions were non-significant.

There is also the possibility that the sample itself was not truly random or representative. Whilst efforts were made to recruit athletes from clubs around one large urban area, as detailed in the Methods section, participants were in effect a convenience sample made up of volunteers, who were recruited through acquaintances of the researcher. Given the design of the study, which relied on participants to return surveys, there was likely an element of self-selection bias for participants who returned surveys versus those who did not.

Caution should be used when comparing the results of this study to that of Park et al.'s (2006) study. While Park and colleagues used a large sample, their sample was of mixed gender, compared to our male-only sample, however evidence from the United Kingdom suggests that women and men score similarly for most character strengths (Linley et al., 2007). Nonetheless, care should be taking when generalising or comparing the results from this study, given the fairly specific sample of adult male amateur athletes.

Future Research and Applications

Future research can be informed by both the findings and limitations of this study. In terms of rectifying issues with the design, future research may wish to emulate Ekstrand, Hägglund and Walden (2009), as well as Brooks et al. (2005) and utilize medical staff attached to professional sports teams to provide accurate and detailed injury data. While this would necessitate a higher calibre of athlete to be investigated, this might not necessarily be

an adverse effect, since if it is the case that certain character strength profiles are unique or different in athletes, this should at least still be present, and perhaps even more pronounced in professional athletes, than in recreational athletes as used in this study. Using this method of data collection (from team medical professionals) would also allow a larger sample to be recruited from various clubs. A further potential methodology future research may wish to explore could be building an 'athlete strength profile' at the beginning of the season, and then correlating these with injury data for each athlete to assess whether any particular combinations of strengths are antecedents to injury. The finding in this study of differences in the ranking of strengths in recreational athletes and the general population from which they are drawn from lends tentative support to the notion that people who partake in recreational sport have a different character strength profile to the general public, which may be indicative of an 'athlete strength profile', and so future research investigating whether this is present in a large, robust sample of amateur or professional athletes, across several contact and non-contact sports, would likely be of keen interest to positive psychologists, sport psychologists, coaches and sports administrators. It would also be of interest to investigate differences between individuals who play team sports and individual sports. The main findings of this research, a relationship between leadership and the number of injuries sustained in a season, also requires more study to further elucidate this relationship, if it can be replicated. Future studies may wish to use different measures of leadership, and combine this with measures of motivation and risk taking behaviour, as well as the aforementioned injury measurement protocols. A similar procedure might be useful for further investigating the relationship between health and lifestyle and sessions missed due to injury. While this study intimated that these variables might be related, future research could combine objective measures of health with subjective measures similar to the ones used in this study.

While the main hypotheses were not supported by the results from this study, the confirmation of the null hypothesis for these strengths, could still be used to inform sports coaches and athletes. As an example, it was hypothesized that athletes high in bravery would get injured more often, and athletes high in prudence would get injured less often. A coach assuming this might therefore encourage athletes to be more prudent and careful, so as to reduce their chance of being injured. He or she might also prescribe extra training to athletes considered brave, in an attempt to ameliorate their risk of injury. The evidence from this study indicates that this coach would in fact be better placed to encourage their athletes to not be as prudent and careful, since no evidence was found to link the prudent athlete with lower injury rates. Furthermore, the coach could actively encourage athletes to be brave, and not prescribe any extra training to naturally 'brave' athletes, since there was no significant association between bravery and increased injury chance.

In practise, coaches might wish to have their athletes fill out a character strength profile at the beginning of the season, and players who scored highly in leadership and/or humour could be prescribed extra strength or fitness training, in the hope to ameliorate their predisposition to injury. Assessments could be carried out on health and lifestyle measures, identifying players who might be at risk of missing more sessions due to injury over the season, and interventions could be carried out by health practitioners to improve the athlete's health measures. Both of these measures might reduce the incidence to these athletes, and if applied generally to recreational athletes on a large scale, this could result in a significant reduction in the number of injuries sustained or time missed, which could in turn benefit individuals by being less likely to injury themselves badly enough to prevent themselves from working, or reducing the number of insurance claims or ACC claims.

Chapter 6. Conclusion

This research sought to investigate whether character strengths and wellbeing had any relation to injury rates in a recreational athlete population in Auckland, New Zealand. While character strengths were not related to injury severity, linear regressions indicated an association between the number of injuries sustained and the character strengths of leadership and humour, i.e., when these strengths were stronger in an individual, they sustained more injuries and missed more sessions due to injury. This was theorised to be due to higher levels of motivation in those with high leadership, and this in turn might relate to risk taking behaviour, which would be expected to correlate to higher injury. A relationship was also observed between the number of sessions missed due to injury, and self-reported health and lifestyle, in that as health and lifestyle decreased, the number of sessions missed increased. The other 22 character strengths, as well as the other wellbeing outcomes, were not found to relate to any injury outcomes, however this does not detract from the value of this research. Rather, the finding that certain strengths are not related to injury may be just as useful to a sports coach, as there is no reason to promote or discourage any particular strength (other than the aforementioned). These findings do intimate that there might well be relationships between certain character strengths, wellbeing outcomes and injury, and that this might be a useful starting point for future investigative research in this area. A secondary aim of this study was to provide descriptive data on the character strength profile of an athletic population, as well as injury data from the three sports studied (rugby, hockey and football) in an amateur, New Zealand context. Results indicated that while there were few differences within the sample itself, differences were noted in the ranking of strengths between the sample and NZ national data, chiefly in the comparatively high ranking attributed to humour, and the low rankings of love of learning and appreciation of beauty and excellence in our sample. The differences that were observed could provide a useful starting point for future

research in the area of character strengths, especially in investigating whether humour is more highly valued in those who play team sports, due to its role in improving cohesion. Our injury data was slightly different to previous established research in rugby and football, although due to the constraints previously discussed this study used a different sample to much of the established research, as well as a different injury incidence measure, limiting the ablitiy to make direct comparisons. Injury rates in hockey were found to be similar to those observed previously.

While not confirming the initial hypotheses, this research can still be of use to athletes and sports coaches. Evidence suggesting that some character strengths are related to injury indicates that athletes may benefit from having their character strengths assessed, which may help to identify athletes who are more likely or at risk to suffer injuries in an up-coming season. Furthermore, the finding that the hypothesized strengths were not related to injury is useful in and of itself, since coaches and athletes who may score highly in this strength likely do not necessarily need to take any additional action to avoid injury. If future research were to further elucidate any relationships between character strengths and injury, this could be an effective method to reduce athletic injury, and potentially of great use to professional and amateur athletes alike.

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Appendices

Appendix A

Participant Information Sheet

Injury Research

Invitation

Haere Mai. You have been identified as a potential participant in a new study being conducted at AUT, and we would like to invite you to be a part of it. My name is Taylor Burns, and I am conducting this research as part of my Masters Thesis. The aim of the study is to investigate how wellbeing and character strengths impact sporting injury and performance. You have been invited to participate in the study, as you are an athlete in a target sport. Your participation in this study is voluntary and you may withdraw at any stage prior to completing the survey. Please read through the information below carefully before consenting or declining to partake in the research.

What is the purpose of this research?

The aim of the research is to find out whether or not character strengths (the positive traits that make up one's personality – like being curious or hopeful), are linked to sporting injury incidence. Furthermore, this research aims to examine whether there is a link between individual wellbeing and sporting injury. The final goal of the research is look for a relationship between character strengths, wellbeing and sporting performance. The results from this research may be published in academic journals, presented at conferences, and through the media. However, individuals will not be identified in any report or publication (i.e., it will be anonymous).

What will happen in this research?

You will be asked to complete two online surveys, the WoW assessment which contains questions on various aspects of wellbeing (described on the website www.workonwellbeing.com), and a questionnaire assessing character strengths, the VIA (more information about which can be found at www.viacharacter.org). This will take about 30 minutes. There will also be several questions on your health and lifestyle. These questions will enable us to better understand your wellbeing and character strength profile. Following completion of these surveys, you will receive feedback on your wellbeing and character strength profile, with information about what this may mean. The information gathered from you and others can help in areas such as reducing injury in athletes and facilitating sports performance, as well as possibly helping to improve the recovery process in athletes.

What are the discomforts and risks?

We do not anticipate that you will experience any discomforts or risks as a result of participating in this survey. In our experience it is unlikely, however the psychometric questions included in this survey may prompt some individuals to be concerned about their wellbeing or aspects of their wellbeing.

How will these discomforts and risks be alleviated?

All questions have been reviewed by experts prior for suitability. You are free to withdraw from the study at any stage without being disadvantaged in any way. If you feel discomfort, please stop the assessment and close your browser. If you are concerned about your wellbeing we encourage you to use the support offered in your local area – doctors and helplines.

What are the benefits?

To thank you for your time and participation in the study you will go in the draw to win one of two 100$ gift vouchers. Your participation in the research will be providing us with valuable information which will potentially benefit athletes who have suffered injury. Your participation will facilitate the researcher in gaining his Masters Degree in Psychology - without your help, this is not possible.

How will my privacy be protected?

Your data will be kept anonymous. No names, contact details or any other identifiable information will be stored with the dataset. The researchers will not receive or have access to

your personal details (name, contact information, etc.) - these will remain with Work on Wellbeing Ltd. The data provided for this research may be shared with other researchers for research purposes, e.g. comparisons in future studies. This means that data may be kept in a databank indefinitely. However, there will be no personal identifiers included in any of the datasets. All data will be stored and shared using codes and emails only.

What are the costs of participating in this research?

There will be no financial costs to you as a participant. However, it will take approximately 30 minutes of your time to complete the survey once during the initial data collection.

What opportunity do I have to consider this invitation?

You will have 14 days to consider whether or not you wish to participate in this research. The researchers encourage you to discuss this with your friends and whānau.

Where can I obtain feedback on the results of this research?

If you wish to obtain feedback on this research, please indicate this below when you consent.

Can I still participate in the WoW assessment, but my data not be used for research purposes?

Yes. Please select “no” below when asked if you agree to participate. You will then be taken to the WoW assessment.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to Project Supervisor, Professor Richard Siegert, at richard.siegert@@aut.ac.nz or on 921 9999 Ext 7885.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O’Connor, ethics@aut.ac.nz , 921 9999 ext 6038.

Appendix B

VIA Strengths Survey (Adult)

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
No matter what the situation, I am able to fit in.	○	○	○	○	○
I never hesitate to publicly express an unpopular opinion.	○	○	○	○	○
I believe honesty is the basis for trust.	○	○	○	○	○
I go out of my way to cheer up people who appear down.	○	○	○	○	○
I treat all people equally regardless of who they might be.	○	○	○	○	○
One of my strengths is helping a group of people work well together even when they have their differences.	○	○	○	○	○
I am a highly disciplined person.	○	○	○	○	○
I always think before I speak.	○	○	○	○	○
I experience deep emotions when I see beautiful things.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
At least once a day, I stop and count my blessings.	○	○	○	○	○
Despite challenges, I always remain hopeful about the future.	○	○	○	○	○
My faith never deserts me during hard times.	○	○	○	○	○
I do not act as if I am a special person.	○	○	○	○	○
I welcome the opportunity to brighten someone else's day with laughter.	○	○	○	○	○
I never seek vengeance.	○	○	○	○	○
I value my ability to think critically.	○	○	○	○	○
I have the ability to make other people feel interesting.	○	○	○	○	○
I must stand up for what I believe even if there are negative results.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
Being able to come up with new and different ideas is one of my strong points.	○	○	○	○	○
I have taken frequent stands in the face of strong opposition.	○	○	○	○	○
I never quit a task before it is done.	○	○	○	○	○
I always keep my promises.	○	○	○	○	○
I have no trouble eating healthy foods.	○	○	○	○	○
I always look on the bright side.	○	○	○	○	○
I am a spiritual person.	○	○	○	○	○
I know how to handle myself in different social situations.	○	○	○	○	○
I always finish what I start.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I really enjoy doing small favors for friends.	○	○	○	○	○
There are people in my life who care as much about my feelings and well-being as they do about their own.	○	○	○	○	○
As a leader, I treat everyone equally well regardless of his or her experience.	○	○	○	○	○
Even when candy or cookies are under my nose, I never overeat.	○	○	○	○	○
I practice my religion.	○	○	○	○	○
I rarely hold a grudge.	○	○	○	○	○
I am always busy with something interesting.	○	○	○	○	○
I am thrilled when I learn something new.	○	○	○	○	○
I like to think of new ways to do things.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I finish things despite obstacles in the way.	○	○	○	○	○
I love to make other people happy.	○	○	○	○	○
I am the most important person in someone else's life.	○	○	○	○	○
I work at my very best when I am a group member.	○	○	○	○	○
Everyone's rights are equally important to me.	○	○	○	○	○
I see beauty that other people pass by without noticing.	○	○	○	○	○
I have a clear picture in my mind about what I want to happen in the future.	○	○	○	○	○
I never brag about my accomplishments.	○	○	○	○	○
I try to have fun in all kinds of situations.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I love what I do.	○	○	○	○	○
I am excited by many different activities.	○	○	○	○	○
I am a true life-long learner.	○	○	○	○	○
I am always coming up with new ways to do things.	○	○	○	○	○
People describe me as "wise beyond my years."	○	○	○	○	○
My promises can be trusted.	○	○	○	○	○
I give everyone a chance.	○	○	○	○	○
To be an effective leader, I treat everyone the same.	○	○	○	○	○
I never want things that are bad for me in the long run, even if they make me feel good in the short run.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I have often been left speechless by the beauty depicted in a movie.	○	○	○	○	○
I am an extremely grateful person.	○	○	○	○	○
I try to add some humor to whatever I do.	○	○	○	○	○
I look forward to each new day.	○	○	○	○	○
I believe it is best to forgive and forget.	○	○	○	○	○
I have many interests.	○	○	○	○	○
When the topic calls for it, I can be a highly rational thinker.	○	○	○	○	○
My friends say that I have lots of new and different ideas.	○	○	○	○	○
I am always able to look at things and see the big picture.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I always stand up for my beliefs.	○	○	○	○	○
I do not give up.	○	○	○	○	○
I am true to my own values.	○	○	○	○	○
I always feel the presence of love in my life.	○	○	○	○	○
I can always stay on a diet.	○	○	○	○	○
I think through the consequences every time before I act.	○	○	○	○	○
I am always aware of the natural beauty in the environment.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I can find something of interest in any situation.	○	○	○	○	○
I read all of the time.	○	○	○	○	○
Thinking things through is part of who I am.	○	○	○	○	○
I am an original thinker.	○	○	○	○	○
I am good at sensing what other people are feeling.	○	○	○	○	○
I have a mature view on life.	○	○	○	○	○
I am as excited about the good fortune of others as I am about my own.	○	○	○	○	○
I can express love to someone else.	○	○	○	○	○
Without exception, I support my teammates or fellow group members.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
My friends always tell me I am a strong but fair leader.	○	○	○	○	○
I always keep straight right from wrong.	○	○	○	○	○
I feel thankful for what I have received in life.	○	○	○	○	○
I know that I will succeed with the goals I set for myself.	○	○	○	○	○
I rarely call attention to myself.	○	○	○	○	○
I have a great sense of humor.	○	○	○	○	○
I rarely try to get even.	○	○	○	○	○
I always weigh the pro's and con's.	○	○	○	○	○
I stick with whatever I decide to do.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I enjoy being kind to others.	○	○	○	○	○
I can accept love from others.	○	○	○	○	○
Even if I disagree with them, I always respect the leaders of my group.	○	○	○	○	○
Even if I do not like someone, I treat him or her fairly.	○	○	○	○	○
As a leader, I try to make all group members happy.	○	○	○	○	○
I am a very careful person.	○	○	○	○	○
I am in awe of simple things in life that others might take for granted	○	○	○	○	○
When I look at my life, I find many things to be grateful for.	○	○	○	○	○
I have been told that modesty is one of my most notable characteristics.	○	○	○	○	○

	Very Much Like Me	Like Me	Neutral	Unlike Me	Very Much Unlike Me
I am usually willing to give someone another chance.	○	○	○	○	○
I think my life is extremely interesting.	○	○	○	○	○
I read a huge variety of books.	○	○	○	○	○
I try to have good reasons for my important decisions.	○	○	○	○	○
I always know what to say to make people feel good.	○	○	○	○	○
I may not say it to others, but I consider myself to be a wise person.	○	○	○	○	○
It is important to me to respect decisions made by my group.	○	○	○	○	○
I always make careful choices.	○	○	○	○	○
I feel a profound sense of appreciation every day.	○	○	○	○	○

Appendix C

Work on Wellbeing Survey

Individual and Employee WoW Assessment

- A WoW assessment is 50 questions and takes about 10 minutes.
- You need to answer all questions in order to proceed.
- Assessments must be completed within 24 hours.
- You can access your personal report and results on completion.

Disclaimer: The WoW Report and associated results should not be used to replace the advice of a qualified professional. If you are experiencing significant psychological difficulties you should contact your doctor or a qualified mental health professional.

The following question asks how satisfied you feel, on a scale from 0 to 10. Zero means you feel 'not at all satisfied' and 10 means you feel 'completely satisfied'.

Overall, how satisfied are you with life as a whole these days?

0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you.

On which step of the ladder would you say you personally feel you stand at this time?

0	1	2	3	4	5	6	7	8	9	10

Worst possible life										Best possible life
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The following question asks how worthwhile you feel the things you do in your life are, on a scale from 0 to 10. Zero means you feel the things you do in your life are 'not at all worthwhile', and 10 means 'completely worthwhile'.

Overall, to what extent do you feel the things you do in your life are worthwhile?

0 Not at all worthwhile	1	2	3	4	5	6	7	8	9	10 Completely worthwhile
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The following question asks about how happy you felt yesterday on a scale from 0 to 10. Zero means you did not experience the feeling of happiness 'at all' yesterday while 10 means you experienced the feeling of happiness 'all of the time' yesterday.

How happy were you yesterday?

0 Did not feel happy at all yesterday	1	2	3	4	5	6	7	8	9	10 Felt happy all of the time yesterday
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The following question asks about how worried and anxious you felt yesterday on a scale from 0 to 10. Zero means you did not experience the feeling of worry and anxiety 'at all' yesterday while 10 means you experienced the feeling of worry and anxiety 'all of the time' yesterday.

How worried and anxious were you yesterday?

0	1	2	3	4	5	6	7	8	9	10
Did not feel worried or anxious at all yesterday										Felt worried or anxious all of the time yesterday
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

The following question asks how you generally feel.

In general, how happy or unhappy do you usually feel?

- ☐ Extremely happy (feeling ecstatic, joyous, fantastic)
- ☐ Very happy (feeling really good, elated)
- ☐ Pretty happy (spirits high, feeling good)
- ☐ Mildly happy (feeling fairly good & somewhat cheerful)
- ☐ Slightly happy (just a bit above normal)
- ☐ Neutral (not particularly happy or unhappy)
- ☐ Slightly unhappy (just a bit below neutral)
- ☐ Mildly unhappy (just a little low)
- ☐ Pretty unhappy (somewhat 'blue', spirits down)
- ☐ Very unhappy (depressed, spirits very low)
- ☐ Extremely unhappy (utterly depressed, completely down)

Below are eight statements with which you may agree or disagree. Using the scale provided, indicate your agreement with each statement by marking the appropriate button.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
I lead a purposeful and meaningful life	☐	☐	☐	☐	☐	☐	☐

My social relationships are supportive and rewarding	☐	☐	☐	☐	☐	☐	☐
I am engaged and interested in my daily activities	☐	☐	☐	☐	☐	☐	☐
I actively contribute to the happiness and wellbeing of others	☐	☐	☐	☐	☐	☐	☐
I am competent and capable in the activities that are important to me	☐	☐	☐	☐	☐	☐	☐
I am a good person and live a good life	☐	☐	☐	☐	☐	☐	☐
I am optimistic about my future	☐	☐	☐	☐	☐	☐	☐
People respect me	☐	☐	☐	☐	☐	☐	☐

Please rate how important and satisfied you are with each life domain. Rate the 10 domains for importance first, then rate the 10 domains for satisfaction.

	Importance											Satisfaction										
	0 Not at all important	1	2	3	4	5	6	7	8	9	10 Completely important	0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
Intimate relationships	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Family	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Friendships and social life	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Work	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Education	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Community life	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Physical health	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fun and leisure	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Financial matters	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Spirituality	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Read each statement and then indicate how much the statement represents you.

I tend to bounce back quickly after hard times.

0 Not at all like me	1	2	3	4	5	6	7	8	9	10 Completely like me
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

I usually come through difficult times with little trouble.

0 Not at all like me	1	2	3	4	5	6	7	8	9	10 Completely like me
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

It does not take me long to recover from a stressful event.

0 Not at all like me	1	2	3	4	5	6	7	8	9	10 Completely like me
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Read each statement and then indicate how satisfied you are with each aspect.

In general, how satisfied are you with your health?

0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

In general, how satisfied are you with your diet?

0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

In general, how satisfied are you with the quality of your sleep?

0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

In general, how satisfied are you with your level of physical activity and exercise?

0 Not at all satisfied	1	2	3	4	5	6	7	8	9	10 Completely satisfied
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Which option best matches your current relationship status?

- ☐ Single
- ☐ In a relationship (under 1 year)
- ☐ In a long-term relationship (over 1 year)
- ☐ Married
- ☐ Divorced
- ☐ Separated but not divorced
- ☐ Widowed
- ☐ Other

What is the highest level of education you have completed?

- ☐ Primary school
- ☐ Some high school
- ☐ High school graduate
- ☐ Trade / technical / vocational training
- ☐ Some college / university
- ☐ College / university graduate
- ☐ Post graduate qualification
- ☐ Other

Which of the following categories best describes your employment situation?

- ☐ Employed, working less than 35 hours per week
- ☐ Employed, working 35 or more hours per week
- ☐ Self-employed, working less than 35 hours per week
- ☐ Self-employed, working 35 or more hours per week
- ☐ Not employed, looking for work
- ☐ Not employed, not looking for work

- ☐ Homemaker, taking care of a family member, or on maternity/paternity leave
- ☐ Not able to work
- ☐ Retired
- ☐ Unsure of my status

If employed, how long have you worked for your current main employer?

Years ☐ Months ☐

Please use the space below to add any more comments you wish to make.