

ENTERING THE ZONE: A POSITIVE PSYCHOLOGICAL FRAMEWORK FOR ATHLETE FLOW AND FLOURISHING

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Thesis submitted in fulfilment of the requirements for the Degree Philosophiae Doctor in
Industrial Psychology at the Vaal Triangle Campus of the North-West University

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November 2015

ACKNOWLEDGEMENTS

I would like to acknowledge the following contributions:

- My Heavenly Father – Alle eer aan U Vader. Vir die onbeskryflike seën wat ek totaal onverdiend van U ontvang. In Jesus naam. Jeremia 29:11.
- Prof “Oom” Ian Rothmann – I have always looked up to you and having been able to complete this work under your guidance was a profound honour. Thank you for your patience, kind manner, encouragement and most of all, wisdom.
- Mrs Cecilia van der Walt for the language editing of the thesis.
- My father Marius Stander – Pa is my held, hierdie een dra ek aan Pa op. Dankie dat Pa my nog altyd aanmoedig om groot te droom. Dit is die grootste geskenk wat ’n man kan vra.
- Dr Elrie Botha – for the continuous encouragement, support and open-door policy.
- My most special family – Annatjie and Elizma Stander; for unconditional love and support. I cannot thank you enough.
- My grandparents, Coen and Maria Barkhuizen, Elleen and (late) Frik Stander, for the fine example you have always set to all of us.
- Tasmin Towsen, my partner in crime – By, without your encouragement and loving support this journey would have been tedious. *This morning, with her, having coffee* (Johnny Cash).
- The special people in my life – Cor, Reinhart, Daan, AJ, Eon, Stewie, Alicia, Leon, Llewellyn, Henry, Armand, Lisinta, and all those close to me. Thank you for your support and for always being there.
- The athletes who committed time and energy to participate in this study.
- The North-West University Sports Department and Valke Rugby Union for allowing such commitment.
- The Optentia Research Focus Area for promoting a culture of research excellence.

“The only way to do great work is to love what you do. If you haven’t found it yet, keep looking. Don’t settle. As with all matters of the heart, you’ll know when you find it.”

Steve Jobs

PREFACE AND DECLARATION

This study is presented in article format. The researcher, Frederick Wilhelm (Ederick) Stander, was responsible for conducting the research and writing the manuscripts. Prof. Sebastiaan (Ian) Rothmann acted the promoter of this study. Dr Elrie Botha was the co-promoter. The three articles that comprise this research have been/will be submitted to the following peer-reviewed journals for publication:

Article 1: *Journal of Psychology in Africa* (accepted for publication)

Article 2: *South African Journal of Psychology* (currently under review)

Article 3: *South African Journal of Sports Medicine* (to be submitted)

I, Frederick Wilhelm Stander, herewith declare that “Entering the zone: A positive psychological framework for athlete flow and flourishing”, is my own original work. Where I included the opinions, findings or commentaries from other authors/ sources, such authors/ sources are fully referenced in text and reference lists.

DECLARATION OF LANGUAGE EDITOR



15 November 2015

I, Ms Cecilia van der Walt, hereby confirm that I took care of the editing of the thesis of Mr Ederick Stander titled ENTERING THE ZONE: A POSITIVE PSYCHOLOGICAL FRAMEWORK FOR ATHLETE FLOW AND FLOURISHING.

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SUMMARY

Title: Entering the zone: A positive psychological framework for athlete flow and flourishing

Keywords: Flow, flourishing, positive psychology, job demands-resources model, conservation of resources theory, social exchange theory, broaden-and-build theory, athletes, sport, structural equation modelling, ecological momentary assessment

Both flow and flourishing are highly favourable human states and have been described as optimal experience phenomena in the well-being literature. This being said, more research is required to gauge how these states can be more readily achieved – in general, but specifically in sport – and athletic contexts; where it has remained largely unexplored. The objective of this research was to ascertain whether specific contexts can influence the experience of flow and flourishing amongst athletes. It further investigated the state-like properties of these experiences, by evaluating whether certain resources in the environment of the athlete can promote flow and flourishing and assessing whether athlete flow is dynamic over time, i.e. whether it fluctuates over the course of a particular athletic cycle.

The research comprised three separate studies, reported in article format. Manuscript 1 evaluated a structural model of athlete flow by investigating the role of both job (sport) – and personal resources in the experience of athlete flow among student athletes. The resources under investigation were teammate relationships and communication (job resources) as well as self-efficacy (a personal resource). Using structural equation modelling direct paths were revealed between teammate relationships, self-efficacy and athlete flow. The findings provide some evidence that athlete flow are associated with contextual factors that relate to the team environment as well as the personal resources of the athlete.

Manuscript 2 focused on the flourishing of athletes. An exploratory study was conducted to evaluate relationships between athlete flourishing, team and individual strength use, team embeddedness and withdrawal behaviour. Results suggested that flourishing is related to team strength use. It also revealed positive paths from both the strength use dimensions to team embeddedness. Flourishing related positively to team embeddedness. Withdrawal behaviour was negatively associated with team embeddedness. The results revealed important information from the perspective of antecedents and outcomes of athlete flourishing.

Manuscript 3 explored the state-like properties of athlete flow by conducting ecological momentary assessment of the experience amongst under-21 Currie Cup rugby players during a competitive stage of their athletic cycle. The objective of this study was twofold. Firstly, it sought to ascertain whether athlete flow will vary over time and during/ after specific key events during an athletic cycle. Secondly, it investigated whether the introduction of specific interventions during such cycle could influence athlete flow experience. The study, which adopted a longitudinal design, revealed that athlete flow was dynamic over time. Positive relationships were also established between challenging athletic activities, as well as strength-based team and individual interventions; and flow. This provides sport coaches and management teams with information that may assist them in assisting athletes to achieve more readily the favourable and optimum human state that is flow.

Recommendations for future research were made.

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CHAPTER 1

INTRODUCTION

This thesis is about a positive psychological framework for athlete flow and flourishing.

Chapter 1 outlines the background and motivation to the research and elaborates on the research problems identified; which informed the formulation of the research questions and aims. A description of the research method and ethical considerations follows, and the chapter division for the thesis is given.

1.1 BACKGROUND AND MOTIVATION FOR THE RESEARCH

Sport and the professional athletic domain have developed into what can be considered today as a significant economic sector (Wagstaff, Fletcher, & Hanton, 2012). It is no longer a trademarked by amateurism but has evolved into a multi-billion dollar industry that is professionally directed on the principles of well-researched and documented management practice (Koenderman, 2013). Globally, major sporting events attract millions of viewers annually, through various media platforms, stimulating interest for potential investment by major corporations (Madrigal, Hamill, & Gill, 2013). Between 1985 and 2006, the percentage quota of sport sponsorship in the budgets of global corporations has increased from 7.8% to 13.9% (Kim, 2010). In South Africa alone, commercial sponsorships of sport by corporate enterprises have increased by 76% between the years 2006 and 2012 (Koenderman, 2013).

Cornellisen, Bob, and Swart (2011) state that an advantage was gained by the country, economically as well as from a social perspective, through major global sporting events such as the International Rugby Board (IRB) World Cup (1995), the International Cricket Council (ICC) World Cup (2003) and the Fédération Internationale de Football Association (FIFA) World Cup (2010), all of which were hosted in South Africa. Sport and Recreation South Africa (SRSA) advances that sport contributed in the region of R41bn to the national economy in 2007, which thus accounted for 2% of the total gross domestic product (GDP) for the country in that year (Chan, 2010). The 2010 FIFA World Cup alone injected R93bn into the local economy, attributing on its own a significant 0.5% of the GDP in that year (FIFA, 2011). The commercial value and robust economic development potential yielded through

sport has led to its maturation as an established contributor to economic growth (Cornelissen, 2007). It is also this potential that has caused the sport industry to become an aggressive pursuer in the search for increased effectiveness and proficiency in a perpetual quest to harness value for a multitude of stakeholders; including athletes, sport coaches, administrators and supporters (Golby & Sheard, 2003). For sport to further evolve and expand as an industry, it is crucial to develop scientific paradigms, models and contexts that are to enhance the way that the sector is managed (Robinson, 2003).

According to Gee (2010), topics within the discipline of sport psychology have received increased attention throughout the last two decades, both from an applied and theoretical point of view. Ultimately, the goal of these topics and their resulting interventions has been to increase the performance of athletes (Sarkar & Fletcher, 2013). None can dispute the value of incorporating psychology into sport as a means of creating an environment where potential can be translated into positive results (Gee, 2010). The use of psychological principles in sport has been proven to facilitate such outcomes as confidence (Neil, Mellalieu, & Hanton, 2006), needs fulfilment (Hodge, Lonsdale, & Jackson, 2009), mental toughness (Gordon & Gucciardi, 2011) and injury prevention (Chan & Hagger, 2012). However, notwithstanding the evidently positive outcomes delineated above, some significant challenges still face the application of psychology in sport. Gee (2010, p. 386) has stated that “the unfamiliar and often esoteric nature of sport psychology appears to be impeding a large number of athletes from soliciting these important services”. This can be attributed to wrongful perceptions that persist amongst a portion of the sporting fraternity that sport psychology can be linked to such aspects as psychopathology and mental ill health (Acharya, 2010).

It is important to develop a clear consensus on what the value proposition is that sport psychology can offer to develop the field coherently and address these perceptions (Fifer, Henschen, Gould, & Ravizza, 2008). A critical strategy in this process is advancing empirical work in the field and substantiating approaches of sport psychology with scientific proof (Levermore & Beacom, 2009; Robinson, 2003). Sport psychology must be scrutinised from a methodical perspective, and the evidence of its value must be transparently presented for the field to grow and develop (Goodwin, 2009). A shift is required to move the notion that sport psychology represents a redress of deficiency towards a clear acknowledgement of its

inherent properties that can lead to optimisation and ultimately, performance at the highest level (Cruickshank & Collins, 2012).

This study aims to evaluate the utilisation of principles in the sport psychology towards the achievement of two distinct and favourable athletic outcomes, namely flow and flourishing. The problem statement outlines the gaps currently prevalent in the athlete flow and flourishing literature.

1.2 PROBLEM STATEMENT

Athlete flow and flourishing as state-like phenomena

In modern day sport, a unique phrase has been developed and is starting to appear in both academic and popular literature (Locke, 2008). This phrase has been devised as “being in the zone” and has led to a perpetual quest among coaches and athletes as it has presumably been associated with the optimal performance of individuals who have managed to enter this apparent highly desirable state (Ravizza, 1977). Williams and Krane (1998) have described the “zone” as a psychological space athletes occupy in which they tend to lose track of the passage of time, are completely absorbed in a particular task or action, perceive themselves to be in absolute control over the outcomes of such action, lose levels of self-consciousness and feel deeply inspired by the highest level of confidence in their own abilities.

Elite athletes deeply desire to be in the zone (Jackson, 1992) and have become interested in methods to acquire the capabilities and skills needed to enter this desirable state. This is because the zone has been linked directly to the ultimate level of performance; a pathway towards which the athlete can perform to the best of his/her ability (Young & Pain, 1999). At a practical level, elite South African athletes have related their experiences of the zone in some ways. Gary Kirsten, South African cricketer and opening batsman, has described the zone as a mental space in which one blocks out all external noise. Naas Botha, Springbok rugby captain, has linked the zone with confidence in one’s ability. Gary Player, the international golfer, has related the zone to being able to deal effectively with challenging situations regardless of the pressure associated with these situations (Cooper & Goodenough, 2007).

Little consensus exists concerning the origin of the reference to the “zone” in sport (Young & Pain, 1999). It is believed that the term was first coined by athletes such as all-time great baseball player and hitter Ted Williams (Douillard, 1994). Shainberg (1989) has said that the derivation of the phrase is unknown; whilst authors such as Cooper (1998) have argued that the zone has been a new reference in the vocabulary of sport psychology. Notwithstanding the lack of insight into the origin of the word, it remains clear that the zone is the desired place where athletes are absorbed fully in the specific athletic activity. Flow allows them to focus completely on the task at hand with a clear sense of confidence of completing such task successfully. Flow leads to an altered perception of time and can achieve the highest possible level of performance (Murphy, 1996; Nicholls, 2010; Williams & Krane, 1998). An elucidation of the concept of being in the zone originates directly from the flow theory (Csikszentmihalyi, 1975, 1990). In fact, in some parts of the literature, the terms “zone” and “flow” are used synonymously in sport psychology (Cooper, 1998; Heathcote, 1996). Young and Pain (1999, p. 21) refer to the zone and flow states as a “universal phenomenon across sports”.

The flow experience in psychology has been described as one during which the individual experiences intrinsic reward (Stavrou, Jackson, Zervas, & Karteroliotis, 2007). It is a state directly linked to optimal human activity (Carter, River, & Sachs, 2013). Flow is achieved “when all the contents of consciousness are in harmony with the goals that define the person’s self – being the subjective conditions of pleasure, happiness, satisfaction, enjoyment” (Csikszentmihalyi & Csikszentmihalyi, 1988, p. 24). During flow, the individual is absorbed in the task at hand (Aherne, Moran, & Lonsdale, 2011). It occurs when there is a full connection between the person performing a particular action and the action itself (Jackson & Marsh, 1996). For flow to occur, an individual must hold the view that his/her skills or competencies are efficient to complete successfully the given task at hand (Jackson & Csikszentmihalyi, 1999). Because of its properties of being totally absorbed in a particular activity, flow has been described by Kimiecik and Harris (1996) as an optimal psychological state. The flow experience has been described as a pleasurable one (Csikszentmihalyi & LeFevre, 1989; Jackson, 1992). It is documented as being richly rewarding and satisfying (Stavrou et al., 2007). Although an established theoretical construct, there is scope for the further exploration of flow in various contexts (Carter et al., 2013).

The study of flow has been particularly relevant within the sport and exercise industry, where a large number of studies have been directed towards understanding the athlete flow experience (Jackson & Eklund, 2002; Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson, Thomas, Marsh, & Smethurst, 2001). Jackson and Roberts (1992) have for example investigated the phenomenon of flow influencing an athlete's perception of his/her ability to successfully balance and negotiate the challenge presented by competition. Jackson (1996) has reported that athletes experience flow as deeply pleasurable. Flow will, therefore, lead to aspects such as exercise adherence. This is because, when an individual enjoys a particular activity, he/she is highly likely to regularly pursue such activity and in the world of sport repetition can be linked to improved proficiency. Kimiecik and Harris (1996) have described flow in sport as an optimal state in which concentration levels are great and the athlete has a very clear sense of direction and goal orientation. When in flow, the athlete is entirely engrossed in the sporting action and can pay undivided attention to the task at hand (Vlachopoulos, Karageorghis, & Terry, 2000).

An important characteristic of flow is its *state-like* nature (Lindsay, Maynard, & Thomas, 2005). Jackson et al. (1998, p. 358) explicitly refer to flow being a “positive psychological state”. It is a dynamic condition and one that can change. Tenenbaum, Fogarty, and Jackson (1999) stated that flow experiences are not necessarily consistent over time. It is possible for an athlete to experience different levels of flow, even within the same game or tournament. Kawabata and Mallet (2011) argue that flow is a subjective feeling experienced by the athlete. Therefore it can be experienced at different levels of intensity. Dietrich (2004) has proposed that certain contrivances are required before an athlete can enter a state of flow, supporting the notion of flow being a process-viewed phenomenon and confirming its state-like properties. It is thus clearly possible to measure flow and this has been addressed by Jackson and Marsh (1996) through the development of the Flow State Scale (FSS), a self-report measure designed for athletes to report their experiences of flow on the nine dimensions identified by Csikszentmihalyi (1993).

Flourishing is a comprehensive state of well-being comprising emotional, social, and psychological well-being (Keyes, 2005). Emotional well-being refers to satisfaction with one's general life circumstances and experiencing an overall sense of positive affect (Keyes, 2002, 2005). Social well-being is characterised by the perception of being part of a

community of people and experiencing positive relations with others (Hone, Jarden, Schofield, & Duncan, 2014, Keyes, 2002, 2005). Psychological well-being is the experience of meaningfulness and purpose in one's life (Keyes, 2002, 2005). The components of flourishing all contribute to holistic mental health and are a prerequisite for an individual's complete mental well-being (Fink, 2014; Keyes & Annas, 2009; van Zyl & Rothmann, 2012).

Flourishing has been described as an optimal human state (Fink, 2014; Keyes, 2005). Younkins (2010) argues that people, who are in a state of flourishing, experience positive emotions, are able to positively relate to others and perceive their lives to be of purpose and direction. Individuals, who function towards the upper end of the mental health continuum, i.e. flourishing individuals, are better equipped against mental ill-health and are less prone to the experience of such conditions as depression (Keyes, Satvinder, Dhingra, & Simoes, 2010). Nelson and Padilla-Walker (2013) highlight the importance of studying flourishing as a means of assisting people to experience comprehensive mental well-being. The flourishing individual can recover faster from setbacks, is better equipped to approach challenges and reports lower levels of perceived helplessness (Diedericks & Rothmann, 2013; Keyes, 2007).

Although studies have explored the effects of sport participation and sport contexts on positive psychological outcomes, none has examined the role of such contexts in the experience of being in the state of flourishing specifically. Malebo, Van Eeden, and Wissing (2007) established sport participation to contribute to the experience of sense of coherence and the bolstering of self-efficacy of athletes. Shachaf and Katz (2014) have argued that sport often provides the context for people to be well; as it requires participants to bounce back from setbacks, relate positively to others in a pursuit of a shared goal and work towards something meaningful and enduring. This view is shared by Penedo and Dahn (2005) who have attributed involvement in sport to optimal functioning, since the environment in which sport often occurs requires the participant to negotiate challenges, display resilience and engage purposefully with others. Although studies have related sport contexts to positive psychological states, none exists in which the flourishing of athletes specifically is explored.

The conclusion that both athlete flow and flourishing are state-like phenomena is an important consideration, which forms the basis of this research. Arguing that athlete flow and flourishing are states, suggests that it is dynamic and likely to change over time, that it can be

experienced by individuals at different levels of intensity and that the ecology/environment in which the athlete is embedded into will influence the experience of such state.

Factors associated with flow and flourishing

The literature refers to some examples where these states were influenced by isolated, single interventions or interpolations. For instance, and in the case of athlete flow, in a study performed by Aherne et al. (2011); mindfulness training was utilised effectively to create levels of flow amongst athletes. Lindsay et al. (2005) successfully used hypnotic intervention to increase flow experiences amongst elite British cyclists. During the study, the researchers used techniques such as visualisation, relaxation and hypnotic regression to recall past optimum performance experiences of the cyclists and subsequently create similar mental contexts in which such performance could be repeated. Jackson (1992, 1996) conducted studies among professional figure skaters, where factors such as focus, arousal, motivation, confidence, attitude and even physical preparation were proven significant predictors of flow experience. In the case of flourishing, no studies have investigated specific antecedents of athlete flourishing specifically. Evidence in other domains have suggested that interventions and directed specific antecedents can influence flourishing state (for example Keyes, 2007; Seligman, 2011); the findings of which it is possible will be transferable to the sport context.

Although the studies outlined above point out that single interventions or interpolations have been used effectively to facilitate flow and flourishing, no research exists which has examined the effect of total contexts/ecologies/environments in the attainment of either of these states. Considering that both are favourable, sought-after states which play a significant role in the well-being experiences of athletes, the need for addressing this gap becomes apparent. In this study, this is approached on the foundation of the established theoretical model known as the Job Demands-Resources (JD-R) model.

The creation of an environment that can enable positive outcomes has been thoroughly researched in various contexts by utilising the JD-R model. The JD-R model holds that every job or work role, regardless of industry, trade or occupation, has certain resources and strains that inherently form part of that role and significantly influence work-related stress (Bakker & Demerouti, 2007; Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003). Demerouti, Bakker, Nachreiner, and Schaufeli (2001), as well as Demerouti and Bakker (2011),

distinguish two defining features of any contextual working environment. The first feature relates to a set of demands and includes those social, psychological, physical or organisational pressures that require a continuous intellectual investment or emotional effort and are constituted as psychological cost (Bakker & Demerouti, 2007). Job demands are directly linked to negative outcomes such as anxiety, burnout or strain and through this have been attributed to the description of containing an “impairment pathway” (Jones, Mahoney, & Gucciardi, 2013). Job resources, on the other hand, are physical, social or organisational capitals that assist individuals to attain workplace goals, to counter demands, alleviate the physiological and psychological strain associated with such demands and harness development and growth (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Job resources lead to good work-related outcomes, including work engagement and motivation amongst employees (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008).

The JD-R model recently expanded to include personal resources such as self-efficacy. Hobfoll, Johnson, Ennis, and Jackson (2003, p. 632) refer to personal resources as “aspects of the self that are generally linked to resiliency”. In the literature personal resources are always postulated in relation to aspects of work, occupational settings or roles; and have been found to assist the individual person in negotiating challenging situations in these settings by allowing that individual greater capacity to successfully utilise his/her job resources and effectively deal with job demands (Van den Heuvel, Demerouti, Schaufeli, & Bakker, 2010). Through this Van den Heuvel et al. (2010) have established that personal resources comprise mediating properties, i.e. that personal resources can ensure that job resources are translated into positive outcomes more prolifically.

There have been some studies that have investigated linkages between job demands/resources and positive outcomes in sport. For example, from a job demands perspective, Bruner, Munroe-Chandler, and Spink (2008) have reported a drop in the level of confidence perceived by elite ice hockey players who received overly critical feedback from their coaches. In the case of job resources, Stander and Mostert (2013) found that a strength-based developmental approach from the organisation effectively led to higher levels of work engagement among school sport coaches. Furthermore, Pummel, Harwood, and Lavallee (2008) found a correlation between support of teammates and team spirit amongst a sample of event horse riders.

With the exception of studies conducted by Stander and Mostert (2013), in which a correlation between strength development and engagement was established in a population of sport coaches, and by Jones et al. (2013) in which a holistic development intervention acted to ease transition to higher levels of rugby league amongst a sample of elite Australian players, no observed work exists in sport psychology literature in which the JD-R model stands central as a theoretical construct. From an athlete perspective, no studies have been done in South Africa where the JD-R model was applied to examine the creation of favourable climates for the achievement of goals.

Research gaps

Firstly it is important to evaluate whether ecologies/ contexts/environments can play a role in attaining athlete flow and flourishing. Considering that flow is an optimum human state and experience (Stavrou et al., 2007), and that flourishing represents total mental well-being (Keyes, 2005), it is imperative to evaluate a) whether contexts affect these outcomes and b) which factors within such environments affect it most.

Second, information is needed regarding the role of team and individual strength use in athlete flourishing. Furthermore, it is not clear whether strength use and flourishing predict team embeddedness and withdrawal behaviour.

Third, relating to the fact that both athlete flow and flourishing are state-like phenomena, it is important to evaluate whether these changes are dynamic, whether they change over time and whether it is influenced by key events/occurrences. Thus far, studies of both flow and flourishing have not considered the dynamic nature of these constructs. In this study, this is addressed utilising ecological momentary assessment to examine athlete flow state over time.

1.3 STUDY AIMS

The purpose of this research was to investigate whether specific contexts have an influence on athlete flow and flourishing. Further to this, this research had the purpose of evaluating the state-like properties of these phenomena.

The specific objectives of this study were to:

- Test the validity, reliability and invariance of a structural model by means of which job resources and personal resources athlete flow can be predicted.
- Investigate the role of strength use to facilitate flourishing, enhance team embeddedness and counter withdrawal behaviour of athletes.
- Examine the role of team embeddedness in withdrawal behaviour of individuals in sport teams.
- Investigate athletes' flow over time as well as factors associated with changes in flow over time.

1.4 RESEARCH METHODOLOGY

The following sections outline the specific research questions raised by each manuscript.

1.4.1 Manuscript 1

Manuscript 1 was concerned with whether a contextual ecology of job- and personal resources would predict athlete flow experience.

The first manuscript's aim was to answer the following research questions:

- Will communication predict athlete flow experience?
- Will teammate relationships predict athlete flow experience?
- Will self-efficacy predict athlete flow experience?

For the purpose of this manuscript, a robust investigation of the available literature was undertaken by consulting various sources, including peer-reviewed articles from both local and international journals, specialist textbooks and chapters and relevant scientific subject matter content. These sources elaborated on the conceptualisation of athlete flow experience and described the job and personal resources included in the study, which were communication, teammate relationships and self-efficacy. The postulated structural paths between the variables in this manuscript necessitated an exploration of earlier work. This exploration was undertaken from the theoretical point of departure of the JD-R model and Conservation of Resources (COR) theory.

1.4.1.1 Research Design

Manuscript 1 was an exploratory and descriptive study. It incorporated a quantitative, cross-sectional research design; which entails measuring the responses of participants at a particular point in time using survey format, utilising instruments of proven scientific vigour and reliability (Shaughnessy, Zechmeister, & Zechmeister, 2009). It explored the postulated structural paths between the variables identified in the research model by comparing and evaluating measurement models and examining the structural paths towards athlete flow.

1.4.1.2 Population and Sample

The population that participated in this study comprised 235 student-athletes from South Africa's two major participation sports, rugby and football. The composition of the participating sample contained 167 (71.1%) football players and 68 (28.9%) rugby players. Further to this, 173 (73.6%) were male and 62 (26.4%) female. Regarding the level of their participation, 163 (69.4%) of participants represented their university in their sport, 46 (19.6%) represented provincial teams and 21 (8.9%) participated in national teams. To ensure that the sample only comprised serious student-athletes who realistically consider themselves as having a chance of practising a sport at a professional level, an inclusion criterion was built into the research design that ensured that all participants had to receive a form of remuneration from their respective universities (in the form of an allowance or bursary) for their participation in sport. Participants also had to be pursuing another significant time-consuming activity alongside their playing of sport, which was studying in the case of the sample group. Demographics of the sample group are provided in manuscript 1.

1.4.1.3 Measuring Instruments

A biographical questionnaire was used to obtain information on the demographic characteristics of participants in manuscript 1. Flow was measured by means of the *Short Flow State Scale-2* (FSS-2) developed by Jackson and Eklund (2002). The resources of communication and teammate relationship were measured using an adapted version of the *Questionnaire on Experience and Assessment of Work*, known by its Dutch abbreviation of VBBA and developed by Van Veldhoven et al. (1997). The personal resource of self-efficacy

was assessed using the *Generalised Self-efficacy Scale* (GSES; Judge, Locke, Durham, & Kluger, 1998). The psychometric properties of these instruments are elaborated on in manuscript 1.

1.4.1.4 Data Analyses

Data analyses were done using structural equation modelling through the statistical programme Mplus 7.31 (Muthén & Muthén, 1998-2014). The variables in the manuscript were measured through categorical indicators and as such unweighted least squares (ULSMV) method was applied to investigate the variance adjusted to ensure accurate estimation of standard errors (Savalei & Rhemtulla, 2012). A robust maximum likelihood (MLR) estimator estimated Akaike Information Criterion (AIC) and Bayes Information Criterion (BIC) to examine model fit.

Structural fit of the model was scrutinised by weighted least-squares with mean and variance adjustment (WLSMV). Chi-square value, weighted root mean square residual (WRMR) and root means square of approximation (RMSEA) were used as indices of absolute fit, while Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were used to calculate incremental fit. Reliability of scales was examined by a formula centred on the sum of squares of standardised loadings as well as the standardised variance of error terms.

1.4.2 Manuscript 2

Manuscript 2 evaluated a model of flourishing by exploring the role of team- and individual strength use in athlete flourishing and assessing whether such flourishing can predict team embeddedness and withdrawal behaviour.

The second manuscript's aim was to answer the following research questions:

- Is team strength use positively associated with the flourishing of athletes?
- Is individual strength use positively associated with the flourishing of athletes?
- Is team strength use negatively associated with withdrawal behaviour of athletes?
- Is individual strength use negatively associated with withdrawal behaviour of athletes?

- Is team strength use positively associated with the team embeddedness of athletes?
- Is individual strength use positively associated with the team embeddedness of athletes?
- Is flourishing positively associated with team embeddedness of athletes?
- Is flourishing negatively associated with withdrawal behaviour of athletes?
- Is team embeddedness negatively associated with withdrawal behaviour of athletes?
- Does team embeddedness moderate the relation between flourishing and withdrawal behaviour of athletes?

A comprehensive literature review was done based on the variables identified and under investigation. This included team and individual strength use, flourishing, team embeddedness and withdrawal behaviour. These are established theoretical constructs but limited work has been undertaken to explore these constructs in a sport setting specifically. The literature presented in manuscript 2 was built on the theoretical foundations of the job demands-resources (JD-R) model, the Conservation of Resources (COR) theory, the broaden-and-build theory and social exchange theory. The proposed structural paths as described in the research questions above were defended based on these theories and studies conducted within the domain of flourishing and well-being.

1.4.2.1 Research Design

Manuscript 2 incorporated a quantitative, cross-sectional research design. The study was exploratory and descriptive. It examined the variables under investigation by evaluating measurement models and establishing the best fit of the data to the theoretical phenomena. Following this, structural models were evaluated. Direct structural paths were specified for testing as well as indirect paths, during which moderation analysis took place.

1.4.2.2 Population and Sample

Manuscript 2 made use of the same population as in manuscript 1. Section 5.1.4 above hence refers. The same inclusion criteria were also applied. The demographic characteristics of the participating sample are provided in table format in manuscript 2.

1.4.2.3 Measuring instruments

The biographical information of the participants was gathered using a biographical questionnaire. The strength use dimensions (team and individual) were measured using the *Strength Use and Deficit Improvement Questionnaire* (SUDIQ) developed by Els et al. (in press). Flourishing was assessed by applying the *Mental Health Continuum - Short Form* (MHC-SF) as compiled by Keyes (2009). Withdrawal behaviour was measured by means of the *Turnover Intention Scale* (TIS-6), which is a shorter version of the original instrument and developed by Bothma and Roodt (2013). Team embeddedness was evaluated by utilising the *Job Embeddedness Scale* (JES) of Mitchell et al. (2001).

1.4.2.4 Data Analysis

Mplus 7.31 was used to analyse the data assimilated for the purpose of this study (Muthén & Muthén, 1998-2014). Structural equation modelling methods were implemented to evaluate the measurement- and structural model and to scrutinise the postulated structural paths between the variables. Akaike Information Criterion (AIC) and Bayes Information Criterion (BIC) were determined by applying a robust maximum likelihood indicator. Chi-square values were calculated for purposes of assessing absolute fit. Root means square of approximation (RMSEA) and standardised root mean square residual (SRMR) were also evaluated for this purpose. Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were used to determine incremental fit. As opposed to the traditional Cronbach alpha method, manuscript 2 utilised composite reliability to assess internal consistency. This is the preferred scientific method in recent literature and is calculated using a formula based on the sum of squares of the standardised loadings and variance of error terms.

1.4.3 Manuscript 3

Manuscript 3 explored the state-like nature of athlete flow by evaluating whether changes in flow levels could be observed amongst a group of athletes over time and assessing whether key events and interventions in an athletic cycle could influence such flow levels. This was done using ecological momentary assessment.

The third manuscript's aim was to answer the following research questions:

- Will athlete flow fluctuate over time?
- Does level of challenge experienced influence athlete flow over time?
- Does the ecology of the team environment influence athlete flow over time?
- Will the introduction of strength-based interventions (at team and individual level) influence the experience of athlete flow over time?

The novice study introduced in manuscript 3 necessitated a thorough evaluation of the literature. No previous studies of athlete flow using ecological momentary assessment (EMA) were found and thus a comprehensive background analysis had to take place to scrutinise the possible value of incorporating EMA methods in evaluating psychological phenomena in sport- and athletic contexts. This was done by consulting major sources in the literature, ranging from peer-reviewed journal articles to specialist book chapters and conference proceedings. With the introduction of strength-based approaches to the study it was important to gauge previous work delineating the value of the strength-based approach as highlighted in the body of positive psychology literature. It was also important to evaluate the role ecologies play in the experience of flow; case in question in this manuscript the effect of challenging athletic activities and key events in the experience of athlete flow over time. The work was conducted from the perspective of flow theory, as well as the Conservation of Resources (COR) theory.

1.4.3.1 Research Design

A longitudinal research design was introduced in manuscript 3 by making use of the method of EMA. In-the-moment responses of participants were recorded using data response cards which were included in a player portfolio for every player; communicating athlete flow over the course of a full athletic cycle. In the case of this research, that cycle was one and a half weeks long (11 days in total). The athletic cycle was divided into athletic events, consisting of team field training sessions, group gymnasium training, a competitive match, individual strength-based coaching sessions and a team-building intervention. Responses were recorded, per individual player in the squad, for every athletic event during the described athletic cycle.

1.4.3.2 Population and Sample

Manuscript 3 made use of a sample comprising 24 male under-21 Currie Cup players, part of a formal squad and contracted to a rugby union in South Africa. The study was conducted during the Currie Cup competition, which is South Africa's foremost professional provincial rugby competition. The sample comprised 18 (75%) white, four (16.67%) black and two (8.33%) coloured players. The sample was well represented as per the conventional rugby positions, with eight (33.33%) of the players being tight forwards (props, hookers or locks); five (20.83%) loose forwards (either flankers or number eights), six (25%) inside backs (scrum halves, fly halves or centres) and five (20.83%) outside backs (wingers or full backs).

1.4.3.3 Measuring Instruments

A data response card was developed to measure player responses in the course of the athletic cycle. This had to be completed by each player during the various athletic activities. Response items were developed for the dimensions of athlete flow, challenge experienced during the athletic event and strength use (at team and individual level). These items were developed by considering already established measures, such as the *Short Flow State Scale-2* (FSS-2) developed by Jackson and Eklund (2002) and the *Strength Use and Deficit Improvement Questionnaire* (SUDIQ) by Van Woerkom et al. (in process). The psychometric properties of these measures, as well as the full data response card players were required to fill in, is communicated in manuscript 3.

1.4.3.4 Data Analysis

Responses of participants were analysed using the SPSS programme (IBM Corp, 2013). Descriptive statistics were gathered pertaining to mean scores, standard deviations, inter-quartile ranges and coefficients of variation. Three levels of data analysis occurred and were reported in manuscript 3. Firstly, the overall scores for the entire squad of players across the entirety of the athletic cycle were reported and described. Secondly, the overall scores per athletic event during the athletic cycle were evaluated. Thirdly, the mean scores of individual players per dimension evaluated in the course of the athletic cycle were provided and described.

1.5 ETHICAL ASPECTS

Formal ethical clearance was sought from the ethics committee of the North-West University before the research was undertaken. This was provided and recorded with the number NWU-00108-14-S8. In all manuscripts, permission to conduct the research was secured from the governing bodies/management teams of the organisations to which participating athletes subscribed. Participants were briefed on the nature and intent of the research and were required to complete an informed consent letter to be able to participate in the research. A formal briefing session was conducted with participants at the onset of the research process. The researcher assured participants of the confidential nature of their responses and they were informed that they could withdraw from the research process at any stage. During data collection for all the various manuscripts, the lead researcher was available for any questions or enquiries. The lead researcher is also registered as an Industrial Psychologist with the Health Professions Council of South Africa (HPCSA; number PS0123145) and as such was able to deal with possible psychological discomfort or trauma participants could have experienced. However, it was not envisaged that the research conducted posed any risk to the psychological or physical well-being of the participants.

1.6 CHAPTER DIVISION

A brief overview of the structure of the remainder of this document is provided below.

Chapter 2

Manuscript 1: The role of teammate relationships, communication and self-efficacy in predicting athlete flow experience

Prepared for: *Journal of Psychology in Africa*

Current status: Accepted for publication, to be published in December 2015

Chapter 3

Manuscript 2: Pathways to flourishing of athletes: The role of team- and individual strength use

Prepared for: *South African Journal of Psychology* (manuscript was shortened to comply with journal submission requirements)

Current status: In review

Chapter 4

Manuscript 3: Evaluating athlete flow over time: Ecological momentary assessment of under-21 Currie Cup rugby players

Prepared for: *South African Journal of Sports Medicine* (manuscript will be shortened to comply with journal submission requirements)

Current status: To be submitted

Chapter 5

Conclusions, limitations and recommendations for future studies

In chapter 5, an overview of all three manuscripts is provided by summarising conclusions, limitations and recommendations for future studies.

References

- Acharya, J. (2010). Professional competence of sport psychologists. *British Journal of Sports Medicine*, 44, 1–82.
- Aherne, C., Moran, A. P., & Lonsdale, C. (2011). The effect of mindfulness training on athletes' flow: An initial investigation. *The Sport Psychologist*, 25, 177–189.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22, 309–328.
- Bakker, A. B., Demerouti, E., Taris, T., Schaufeli, W. B., & Schreurs, P. (2003). A multi-group analysis of the job demands-resources model in four home care organizations. *International Journal of Stress Management*, 10, 16–38.
- Bothma, C. F., & Roodt, G. (2013). The validation of the turnover intention scale: original research. *SA Journal of Human Resource Management*, 11(1), 1–12.
- Bruner, M.W., Munroe-Chandler, K.J., & Spink, K.S. (2008). Entry into elite sport: A preliminary investigation into the transition experiences of rookie athletes. *Journal of Applied Sport Psychology*, 20, 236–252.
- Carter, L., River, B., & Sachs, M. L. (2013). Flow in sport, exercise, and performance: A review with implications for future research. *Journal of Multidisciplinary Research*, 5(3), 17–31.
- Chan, J. (2010). *Economic value of sport*. (Unpublished master's dissertation). Gordon Institute of Business Science, University of Pretoria, South Africa.
- Chan, D. K. C., & Hagger, M. S. (2012). Self-determined forms of motivation predict sport injury prevention and rehabilitation intentions. *Journal of Science and Medicine in Sport*, 15, 398–406.
- Cooper, A. (1998). *Playing in the zone: Exploring the spiritual dimensions of sport*. Boston, MA: Shambhala.
- Cooper, M., & Goodenough, T. (2007). *In the zone with South Africa's sport heroes: How to achieve top performance in sport and life*. Cape Town, South Africa: Zebra Press.
- Cornelissen, S. (2007). The changing political economy of global sport and the 2010 FIFA World Cup. *Politikon*, 34(3), 241–259.
- Cornelissen, S., Bob, U., & Swart, K. (2011). Sport mega-events and their legacies: The 2010 FIFA World Cup. *Development Southern Africa*, 28(3), 305–306.

- Cruickshank, A., & Collins, D. (2012). Change management: The case of the elite sport performance team. *Journal of Change Management*, 12(2), 209–229.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper & Row.
- Csikszentmihalyi, M. (1993). *The evolving self*. New York, NY: Harper & Row.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. (1988). *Optimal experience: Psychological studies of flow in consciousness*. New York, NY: Cambridge University Press.
- Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815–822.
- Demerouti, E., & Bakker, A. B. (2011). The job demands-resources model: Challenges for future research. *South African Journal of Industrial Psychology* 37(2), 1–9.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512.
- Diedericks, E., & Rothmann, S. (2013). Flourishing of information technology professionals: the role of work engagement and job satisfaction. *Journal of Psychology in Africa*, 23(2), 225–233.
- Douillard, J. (1994). *Body, mind and sport*. New York, NY: Three Rivers Press.
- Fifer, A., Henschen, K., Gould, D., & Ravizza, K. (2008). What works when working with athletes. *The Sport Psychologist*, 22, 356–377.
- Fink, M. A. (2014) Flourishing: Exploring predictors of mental health within the college environment. *Journal of American College Health*, 62(6), 380–388.
- Gee, C.J. (2010). How does sport psychology actually improve athletic performance? A framework to facilitate athletes' and coaches' understanding. *Behavior Modification*, 34, 386–402.
- Golby, J., & Sheard, M. (2003). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences*, 37, 933–942.
- Goodwin, C. J., & Scripture, E. W. (2009). The application of “new psychology” methodology to athletics. In C. D. Green, & L. T. Benjamin, Jr. (Eds.), *Psychology gets in the game: Sport, mind, and behavior, 1880–1960* (pp. 78–97). Lincoln, Nebraska, NE: University of Nebraska Press.
- Gordon, S., & Gucciardi, D.F. (2011). A strength-based approach to coaching mental toughness. *Journal of Sport Psychology in Action*, 2, 143–155.

- Hakanen, J. J., Perhoniemi, R., & Toppinen-Tanner, S. (2008). Positive gain spirals at work: From job resources to work engagement, personal initiative and work-unit innovativeness. *Journal of Vocational Behavior*, 73(1), 78–91.
- Heathcote, F. (1996). *Peak performance: Zen and the sporting zone*. Dublin, Ireland: Wolfhound.
- Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632–663.
- Hodge, K., Lonsdale, C., & Jackson, S.A. (2009). Athlete engagement in elite sport: An exploratory investigation of antecedents and consequences. *The Sport Psychologist*, 23, 186–202.
- Hone, L. C., Jarden, A., Schofield, G. M., & Duncan, S. (2014). Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Wellbeing*, 4(1), 62–90.
- Jackson, S. A. (1992). Athletes in flow: A qualitative investigation of flow states in elite figure skaters. *Journal of Applied Sport Psychology*, 4(2), 161–180.
- Jackson, S. A. (1996). Toward a conceptual understanding of the flow experience in elite athletes. *Research Quarterly for Exercise and Sport*, 67, 76–90.
- Jackson, S. A., & Csikszentmihalyi, M. (1999). *Flow in sports: The keys to optimal experiences and performances*. Leeds, United Kingdom: Human Kinetics.
- Jackson, S. A., & Eklund, R. C. (2002). Assessing flow in physical activity: The Flow State Scale-2 and the Dispositional Flow Scale-2. *Journal of Sport & Exercise Psychology*, 24, 133–150.
- Jackson, S. A., Kimiecik, J. C., Ford, S., & Marsh, H. W. (1998). Psychological correlates of flow in sport. *Journal of Sport and Exercise Psychology*, 20, 358–378.
- Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The Flow State Scale. *Journal of Sport and Exercise Psychology*, 18, 17–35.
- Jackson, S. A., & Roberts, G. C. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. *The Sport Psychologist*, 6, 156–171.
- Jackson, S. A., Thomas, P. R., Marsh, H. W., & Smethurst, C. J. (2001). Relationships between flow, self-concept, psychological skills, and performance. *Journal of Applied Sport Psychology*, 13, 129–153.

- Jones, R. A., Mahoney, J. W., & Gucciardi, D. F. (2013). On the transition into elite rugby league: Perceptions of players and coaching staff. *Sport, Exercise, and Performance Psychology*. Advance online publication. doi: 10.1037/spy0000013.
- Judge, T. A., Locke, E. A., Durham, C. C., & Kluger, A. N. (1998). Dispositional effects on job and life satisfaction: The role of core evaluations. *Journal of Applied Psychology*, 83, 17–34.
- Kawabata, M., & Mallett, C. J. (2011). Flow experience in physical activity: Examination of the internal structure of flow from a process-related perspective. *Motivation and Emotion*, 35, 393–402.
- Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 43, 207–222.
- Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73, 539–548.
- Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist*, 62, 95–108.
- Keyes, C. L. M., & Annas, J. (2009). Feeling good and functioning well: Distinctive concepts in ancient philosophy and contemporary science. *Journal of Positive Psychology*, 4, 197–201.
- Keyes, C. L., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health*, 100(12), 2366–2376.
- Kimiecik, J. C., & Harris, A. T. (1996). What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *Journal of Sport & Exercise Psychology*, 18, 247–263.
- Kim, J. (2010). The worth of sport event sponsorship: An event study. *Journal of Management and Marketing Research*, 5(1), 1–14.
- Koenderman, T. (2013). Tough times for sponsored sport. *Finweek*, 50–51.
- Levermore, K., & Beacom, A. (2009). *Sport and international development*. Basingstoke, United Kingdom: Palgrave MacMillan.
- Lindsay, P., Maynard, I., & Thomas, O. (2005). Effects of hypnosis on flow states and cycling performance. *The Sport Psychologist*, 19, 164–177.

- Locke, A. (2008). Managing agency for athletic performance: A discursive approach to the zone. *Qualitative Research in Psychology*, 5(2), 103–126.
- Madrigal, L., Hamill, S., & Gill, D. L. (2013). Mind over matter: The development of the Mental Toughness Scale (MTS). *The Sport Psychologist*, 27, 62–77.
- Malebo, A., Van Eeden, C., & Wissing, M. P. (2007). Sport participation, psychological well-being, and psychosocial development in a group of young black adults. *South African Journal of Psychology*, 37(1), 188–206.
- Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablinski, C. J., & Erez, M. (2001). Why people stay: Using job embeddedness to predict voluntary turnover. *Academy of Management Journal*, 44(6), 1102–1121.
- Murphy, S. (1996). *The achievement zone*. New York, NY: Berkley.
- Neil, R., Mellalieu, S. D., & Hanton, S. (2008). Psychological skills usage and the competitive anxiety response as a function of skill level in rugby union. *Journal of Sports Science and Medicine*, 5, 415–423.
- Nelson, L. J., & Padilla-Walker, L. M. (2013). Flourishing and floundering in emerging adult college students. *Emerging Adulthood*, 1(1), 67–78.
- Nicholls, A. (2010). Get into the zone! *Peak Performance*, 294(12), 1–5.
- Muthén, L. K., & Muthén, B. O. (1998–2014). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18(2), 189–193.
- Pummel, B., Harwood, C., & Lavalley, D. (2008). Jumping to the next level: A qualitative examination of within-career transition in adolescent event riders. *Psychology of Sport and Exercise*, 9, 427–447.
- Ravizza, K. (1977). A subjective study of the athlete's greatest moment in sport. In *Proceedings of the Canadian Psychomotor Symposium, Psychomotor Learning and Sport Psychology Symposium* (pp. 399–404). Toronto, Canada: Coaching Association of Canada.
- Robinson, L. (2003). The business of sport. In B. Houlihan (Ed.), *Sport and society: A student introduction* (pp. 165–183). London, United Kingdom: Sage.
- Sarkar, M., & Fletcher, D. (2013). How should we measure psychological resilience in sport performers? *Measurement in Physical Education and Exercise Science*, 17, 264–280.

- Savalei, V., & Rhemtulla, M. (2012). The performance of robust test statistics with categorical data. *British Journal of Mathematical and Statistical Psychology*, 66(2), 201–223.
- Schachaf, M., & Katz, Y. J. (2014). The relationship between high school students' participation in sporting activity and personality variables. *Athens Journal of Sports*, 1(1), 35–43.
- Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. New York, NY: Free Press.
- Shainberg, L. (1989). Finding the zone. *New York Times Magazine*, 34–39.
- Shaughnessy, J.J., Zechmeister, E.B., & Zechmeister, J.S. (2009). *Research Methods in Psychology* (8th ed.). New York, NY: McGraw-Hill Companies.
- Stander, F. W., & Mostert, K. (2013). Assessing the organisational and individual strengths use and deficit improvement amongst sport coaches. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 39(2), 1–13.
- Stavrou, N. A., Jackson, S. A., Zervas, Y., & Karteroliotis, K. (2007). Flow experience and athletes' performance with reference to the orthogonal model of flow. *The Sport Psychologist*, 21, 438–457.
- Tenenbaum, G., Fogarty, G. J., & Jackson, S.A. (1999). The flow experience: A Rasch analysis of Jackson's Flow State Scale. *Journal of outcome measurement*, 3, 278–294.
- Van den Heuvel, M., Demerouti, E., Schaufeli, W. B., & Bakker, A. B. (2010). Personal resources and work engagement in the face of change. In J. Houdmont (Ed.), *Occupational health psychology, European perspectives on research, education and practice*, Vol. 4 (pp. 124–150). Chichester, UK: Wiley.
- Van Veldhoven, M., Meijman, T. F., Broersen, J. P. J., & Fortuin, R. J. (1997). *Handleiding VBBA: Onderzoek naar de beleving van psychosociale arbeidsbelasting en werkstress met behulp van de vragenlijst beleving en beoordeling van de arbeid* [Manual VBBA: Research on the experience of psychosocial workload and job stress by means of the Questionnaire on the Experience and Evaluation of Work]. Amsterdam, The Netherlands: SKB.
- Van Woerkom, M., Els, C., Mostert, K., Rothmann, S. Jnr, De Beer, L. T. & Bakker, A.B. (in process). Following a strength-based and deficiency-based approach: The development and psychometric properties of a new scale.

- Van Zyl, L. E., & Rothmann, S. (2012). Flourishing of students in a tertiary education institution in South Africa. *Journal of Psychology in Africa*, 22(4), 593–599.
- Vlachopoulos, S. P., Karageorghis, C. I., & Terry, P. C. (2000). Hierarchical confirmatory factor analysis of the Flow State Scale in exercise. *Journal of Sport Sciences*, 18, 815–823.
- Wagstaff, C., Fletcher, D., & Hanton, S. (2012). Positive organizational psychology in sport: An ethnography of organizational functioning in a national sports organisation. *Journal of Applied Sport Psychology*, 24, 26–47.
- Williams, J. M., & Krane, V. (1998). Psychological characteristics of peak performance. In J. M. Williams (Ed.) *Applied sport psychology personal growth to peak performance* (pp. 158–170). Mountain View, CA: Mayfield Publishing Company.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationship between job resources, personal resources and work engagement. *Journal of Vocational Behavior*, 74, 253–244.
- Young, J. (2012). Keys to effective communication with players. *Australian Tennis Magazine*, 37(2), 68–69.
- Young, J. A., & Pain, M. D. (1999). In the zone: Evidence of a universal phenomenon for athletes across sports. *The Online Journal of Sport Psychology*, 1(3), 21–30.
- Younkins, E. W. (2010). Human nature, flourishing, and happiness: Toward a synthesis of Aristotelianism, Austrian economics, positive psychology, and Ayn Rand's Objectivism. *Libertarian Papers*, 2(35), 1–49.

CHAPTER 2

MANUSCRIPT 1

THE ROLE OF TEAMMATE RELATIONSHIPS, COMMUNICATION AND SELF-EFFICACY IN PREDICTING ATHLETE FLOW EXPERIENCE

The Role of Teammate Relationships, Communication and Self-Efficacy in Predicting Athlete Flow Experience

Abstract

This study aimed at testing a structural model of athlete flow in a sample of South African students. A quantitative, cross-sectional research design was implemented. Participants completed self-report measures at pre-arranged times that were near the completion of athletic activities. Student athletes ($n = 235$) participating in South Africa's two major sports, football and rugby, were surveyed. The instruments utilised in this study included the Short Flow State Scale-2, The Questionnaire on Experience and Assessment of Work, and the Generalised Self-Efficacy Scale. The results indicated positive relationships between the variables and established predictor paths. Teammate relationships and self-efficacy were established as best predictors of flow experiences of athletes.

Keywords: Job resources, communication, teammate relationships, personal resources, self-efficacy, athlete flow

In psychology, the concept of “flow” was first introduced by Csikszentmihalyi (1990) as a highly rewarding and intrinsic motivational state. Since its first introduction, the concept has developed into a central topic in the movement of positive psychology, alluding to the study of optimal experience states (Kimiecik & Harris, 1996). The flow experience has been described as a highly satisfying and pleasurable one (Shernoff, Abdi, Anderson, & Csikszentmihalyi, 2014; Stavrou, Jackson, Zervas, & Karteroliotis, 2007). Flow occurs when a complete connection exists between the individual performing a particular task and the task itself (Jackson & Marsh, 1996; Shernoff et al., 2014). In other words, there is an immersion between an individual and a particular activity that is being performed, causing this individual to be absorbed in the activity and deriving pleasure and intrinsic reward from performing it (Csikszentmihalyi & LeFevre, 1989; Inghilleri, Riva, & Riva, 2014; Jackson, 1992). Flow is achieved “when all the contents of consciousness are in harmony with each other, and with the goals that define the person’s self” (Csikszentmihalyi & Csikszentmihalyi, 1988, p. 24). Considering this description, flow can be defined as the psychology of peak experience (Csikszentmihalyi, 1990; Inghilleri, Riva, & Riva, 2014; Moneta, 2012; Peifer, Schulz, Schächinger, Baumann, & Antoni, 2014).

Although the term being in the “zone” is generally considered a modern, popularised phrase within the context of sport, it is interesting to observe that Mihaly Csikszentmihalyi used this word in his earliest recordings of the conceptualisation of flow experience; alluding to flow as the capability to enter the zone (Csikszentmihalyi, 1990). The study and application of the flow dimensions in sport has been purposefully seeking that metaphorical zone, alluding to the optimal state of functioning that is associated with flow, as a means of gaining the highest level of performance from athletes (Moreno, Cervelló, & González-Cutre, 2010; Pates & Maynard, 2000). Because the “zone” is associated with optimum performance and peak functioning, there has been a keen interest in flow experience within the domain of sport (Carter, River, & Sachs, 2013). The flow experience leads to heightened focus and engagement with a particular athletic activity (Jackson & Eklund, 2002; Peifer et al., 2014).

When in a state of flow, the athlete is entirely immersed in the particular athletic activity and observes the dimensions of flow as outlined by Csikszentmihalyi (1990). It is this engrossment and full absorption that ignite the athlete’s optimum functioning when competing or participating in that athletic activity (Carter, River, & Sachs, 2013). In the

perpetual quest for optimum performance in sport and athletic activity, the study of flow has become empirical and defined. It is this refinement that has led to the need for flow in sport to be measured.

Despite this empirical investigation of flow and the clear association of the phenomena to optimum experience in the context of sport, few studies have investigated whether it is possible to create contexts for athletes to more readily achieve a flow state in their sport. No studies have been conducted to determine which resources athletes require, both from their team/sport environment and at a personal level, to achieve the flow experience.

Flow in Sport

An important characteristic of flow is its *state-like* nature (Lindsay, Maynard, & Thomas, 2005; Inghilleri, Riva, & Riva, 2014; Peifer et al., 2014). Jackson, Kimiecik, Ford, and Marsh (1998, p. 358) explicitly refer to flow being a “positive psychological state”. It is therefore a dynamic condition and one that can change. Tenenbaum, Fogarty, and Jackson (1999) have mentioned that flow experiences are not necessarily consistent over time. It is quite possible for an athlete to experience different levels of flow, even within the same game or tournament. Kawabata and Mallet (2011) argue that flow is a subjective feeling experienced by the athlete and can therefore be perceived in different levels of intensity. Dietrich (2004) has proposed that certain contrivances are required before an athlete can enter a state of flow, supporting the notion of flow being a process phenomenon and confirming its state-like properties. Therefore it should be possible to create environments where athletes will more readily be able to enter a state of flow (Peifer et al., 2014).

Flow, as described by Csikszentmihalyi (1990), comprises nine dimensions. The first dimension is a challenge and skill balance between an activity and the participant in such activity; whereby the participant has complete confidence that he/she has the capability of executing a particular task. Following this is merged action in activity and awareness; during which the execution of the task is a natural part of the task itself. A person experiencing flow also enjoys clarity in goals; where absolute certainty is present within the person pertaining to desirable outcomes of the activity. During flow unambiguous feedback is generated; whereby execution of the task at hand is met with clear positive or negative appraisal. Flow is further

characterised by full concentration on the task at hand; during which the individual is totally immersed in and focused on performing the activity. During the flow state the individual experiences a heightened sense of control; implying such individual has the power to manage the results of the activity, as well as loss of self-consciousness; where the performed activity becomes an end in itself and the individual is fully engrossed in the activity. Flow experience is accompanied by time transformation; implying the sense of time is distorted and the individual is completely in the moment. Finally, flow is characterised by the experience of reward when performing an activity; inferring that flow is related to being an optimal and enjoyable human experience.

Job Demands–Resources Model and Conservation of Resources Theory

With the argument being that flow is a state-like concept, it is plausible to postulate that its dynamic condition can be influenced by a number of factors (Moneta, 2012; Peifer et al., 2014). Moreno, Cervelló, and González-Cutre (2010) argued that athletes experience flow due to a) an athletic climate of variables that are conducive to flow experience and b) the intrinsic inclination of the athlete that is either geared towards flow experience or not. This implies that there are some climate- or organisational factors that shape flow, as well as some personal factors. In this study, the Job Demands-Resources (JD-R) model, as well as the Conservation of Resources (COR) theory is proposed as theoretical foundations to investigate the effect of environmental factors on the athlete's ability to enter the flow state. Studies have investigated the role of positive behaviours in the athlete's entering of flow state. Aherne, Moran, and Lonsdale (2011) utilised mindfulness training, and Lindsay et al. (2005) used hypnotic intervention to promote flow. However, few studies have investigated the effect of contextual factors on athletes' flow.

The JD-R model holds that every job or work role, regardless of industry, trade or occupation, has certain strains and resources that are inherently part of that role and significantly influences work-related stress (Bakker & Demerouti, 2007; Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003). The first feature relates to a set of demands and includes those social, psychological, physical or organisational pressures that require a continuous intellectual investment or emotional effort and is constituted as psychological cost (Bakker & Demerouti, 2007). Job demands are directly linked to negative outcomes such as anxiety,

burnout or strain and through this have been described as containing an “impairment pathway” (Jones, Mahoney, & Gucciardi, 2013). Job resources, on the other hand, are physical, social or organisational capitals that assist individuals in attaining workplace goals, in countering demands, alleviating strain of the physiological and psychological strain associated with such demands and harnessing development and growth (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Job resources lead to positive outcomes, including engagement and motivation amongst employees (Hakanen, Perhoniemi, & Toppinen-Tanner, 2008).

The JD-R model has been researched in the broader domain of sport. For example, from a demands perspective, Bruner, Munroe-Chandler, and Spink (2008) have reported a drop in the level of confidence perceived by elite ice hockey players who received overly critical feedback from their coaches. Pummel, Harwood, and Lavalley (2008) found a relation between informational support by teammates and team spirit amongst a sample of event horse riders. However, no studies have investigated the JD-R model in the achievement of athlete flow. In this study, this will be explored from the basis of Moreno, Cervelló, and González-Cutre’s (2010) argument that a conducive athletic climate will serve as a resource to athletes towards flow experience.

COR theory (Hobfoll, 1989) proposes that individuals will actively seek to accumulate resources in an effort to reduce stress and be more functional and prosperous. According to Alvaro et al. (2010), the COR explains why human beings consistently seek resources within their environment – these resources act as mitigation against the challenging environmental demands we face and assist us in functioning optimally. Halbesleben, Neveu, Paustian-Underdahl, and Westman (2014) argue that individuals will seek to protect, further strengthen and enhance availability of current resources, and as such these resources become valuable assets in the pursuit of heightened performance and increased functioning. Two environmental or job resources, namely communication and teammate relationships as well as a personal resource (generalised self-efficacy) are explored in this study.

Communication refers to the extent to which an individual belonging to a specific organisation/team is kept in the know about how such team is run, how decisions are made and who should be approached for which type of problems (Van Veldhoven, Meijman,

Broersen, & Fortuin, 1997). It has been proven as an important resource in the performance of athletes, particularly as a means of creating a climate of trust and respect between player and coach (Young, 2012). Jowett and Cockerill (2003) found that open communication predicted effective relationships between coaches and Olympic medallists and assisted these athletes in performing at an optimal level. Young (2012) argues that this is because communication that is both open and directed ensures that an environment is created where the athlete can optimally perform with the required confidence. From the perspective of athlete flow, communication, in the context of a team sport, should play a significant role in harnessing the dimensions of flow. Clear communication will ensure clarity in what the goals of the sport team, and subsequently the individual athlete, are (Jowett & Cockerill, 2003). When considering that flow encompasses clarity in goals (Csikszentmihalyi, 1990; Shernoff et al., 2014), it is clear that communication in a team context can potentially influence athlete flow experience. This is also true of the flow dimensions of unambiguous feedback, which occur because of a clear outcome understanding harnessed through proper communication at team level, and heightened focus, which can be achieved by establishing a clear end result for the athletic activity in question (Jackson & Eklund, 2002; Peifer et al., 2014).

Teammate relationships are subsequently postulated as a resource that could predict flow. Van Veldhoven et al. (1997) describe teammate relationships as the appreciation members of a team have for each other, being able to count on the support of other members of the team and a general culture of acceptance and sustenance existing in a team of individuals. Elbe, Strahler, Krstrup, Wikman, and Stelter (2010) established that healthy relationships with teammates led to higher levels of flow amongst a sample of male football players from Denmark. This is because healthy teammate relationships assist the athlete in deriving greater enjoyment and reward from performing a particular physical activity as part of their sport, and hence the improved ability to perform at peak level. In the framework of team sports, supporting climates in a team context has been proven to be influential towards flow experience in some studies (Flores, Salguero, & Márquez, 2008; Gano-Overway, Guivernau, Magyar, Waldron, & Ewing, 2005; Pensgard & Roberts, 2002). Supporting relationships in the context of the athlete's team environment provide the trust and assistance for the athlete to perform with confidence and conviction, and without fear of failure (Moreno, Cervelló, & González-Cutre, 2010; Young, 2012) – critical components of the athlete flow experience (Csikszentmihalyi, 1990).

Personal Resources and Athlete Flow

The JD-R model later expanded to include personal resources. Hobfoll, Johnson, Ennis, and Jackson (2003, p. 632) refer to personal resources as “aspects of the self that are generally linked to resiliency”. In the literature, personal resources are always postulated in relation to aspects of work contexts, and have been found to assist the individual person in negotiating challenging situations in the workplace by allowing that individual greater capacity to successfully utilise his/her job resources and effectively deal with job demands (Van den Heuvel, Demerouti, Schaufeli, & Bakker, 2010).

In this study, the personal resource of self-efficacy is postulated as a predictor of athlete flow. Self-efficacy is described by Luszczynska, Scholz, and Schwarzer (2005) as the inherent belief which an individual has that he/she can successfully overcome challenges and pressures. Barker, Jones, and Greenlees (2013, p. 228) have described self-efficacy as “one of the most important psychological variables associated with sport performance”. Shelangoski, Hambrick, Gross, and Weber (2014) established correlation between self-efficacy and student-athletes’ ability to progress to higher levels of participation in their sport. Self-efficacy will assist the individual athlete to enter the flow state as this athlete will perceive him/herself to have the necessary skill set to successfully negotiate the challenge presented by the particular athletic activity, as outlined as a dimension of flow experience (Csikszentmihalyi, 1990). Self-efficacy, which is a deeply meaningful personal capital, enables self-belief within the athlete, which mobilises the athlete’s control over the athletic task, rendering him/her in a state of being able to more capably perform tasks and having greater power over the outcome of his/her athletic endeavour, according to the flow dimension (Inghilleri, Riva, & Riva, 2014; Peifer et al., 2014). Thus, if self-efficacy is not present within the individual athlete, that athlete, at a personal level, is not sufficiently equipped to more readily achieve flow state (Dietrich, 2004). However, should the individual athlete have self-efficacy, that athlete will be psychologically equipped towards an optimal experience – gearing such athlete for flow experience and ultimately, greater performance (Barker, Jones, & Greenlees, 2013).

Job and personal resources will lead to higher levels of perceived athlete flow. This is based on the JD-R model, as well as the COR theory, which argue that individuals are consistently

seeking and assimilating resources to mitigate stressors, negotiate the challenges of their environment and achieve optimal experience states such as flow (Hobfoll, 1989). These resources include objects, conditions, personal characteristics and energies and an individual will only be able to achieve optimal states such as flow when there is a perceived a) presence of resources, b) sense that resources will increase or c) feeling that resources will not diminish (Grandey & Cropanzano, 1999).

Study aims

The aims of this study were to investigate whether communication, teammate relationships and self-efficacy could predict athlete flow. The hypothesised model is shown in Figure 1.

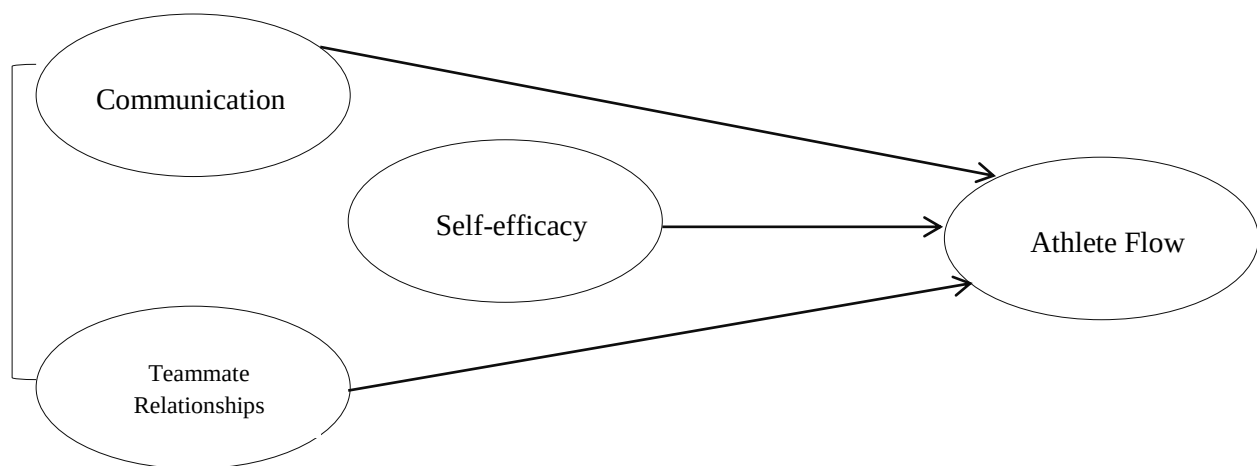


Figure 1. The hypothesised model

Based on this model, the following hypotheses are proposed:

H1: Communication is positively associated with athlete flow.

H2: Teammate relationships positively associated with athlete flow.

H3: Self-efficacy positively associated with athlete flow.

Method

Research Approach

A cross-sectional research design was implemented for purposes of this study. This refers to a design that assesses the responses from various respondents at a specific point in time

(Salkind, 2009; Shaughnessy, Zechmeister, & Zechmeister, 2009). The study was quantitative, descriptive and exploratory.

Participants and Setting

Participants were 235 student athletes who participate in South Africa's two major sports, football and rugby. All participants were actively busy with academic pursuits alongside their playing of sport when they participated in this research project. Participants included 167 (71.1%) football players and 68 (28.9%) rugby players. Of the entire sample, 173 (73.6%) were male and 62 (26.4%) female. Considering level of participation, 163 (69.4%) of participants have represented their university in their sport, 46 (19.6%) have represented provincial teams and 21 (8.9%) have participated in national teams.

All participants had to adhere to the following criteria to be included in the study:

- Had to receive a form of compensation for their participation in sport (for example through a bursary, small salary or allowance) at the time of the research.
- Had to be actively involved in another significant time-consuming activity, such as work or study, alongside their sport participation at the time of the research.

These criteria ensured that only serious student athletes, who all had the prospect of possibly developing into full-time athletes in the future, were included in this study.

Measuring Instruments

Participants provided data on their biographical characteristics (e.g. age, gender, qualification and home language).

Flow was measured through the *Short Flow State Scale-2* (FSS-2) developed by Jackson and Eklund (2002). This comprises nine items representing the nine dimensions of flow where respondents record their responses on a five-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In separate studies, Jackson and Eklund (2002) have established sufficient internal consistency for the FSS-2, reporting Cronbach's alpha

coefficients of 0.85. An example item for the FSS-2 is “The way time passed seem to be different from normal”. The FSS-2 items are answered from the context of a particular sport event, such as a recent match.

Job resources of communication and teammate relationship were measured by means of an adapted version of the *Questionnaire on Experience and Assessment of Work*, known by its Dutch abbreviation of VBBA and developed by Van Veldhoven et al. (1997). The VBBA is scored on a four-point frequency rating scale, ranging from 0 (*never*) to 3 (*always*). Van Veldhoven, Meijman, Broersen, and Fortuin (2002) found sufficient levels of internal consistency for communication ($\alpha = 0.79$), as well as for relationship with colleagues ($\alpha = 0.87$). An example item for communication is “Do you hear enough about how your sport team is run?” An example item for teammate relationships is “Is there a good atmosphere between you and your team mates?”

The personal resource of self-efficacy was assessed through the *Generalised Self-efficacy Scale* (GSES; Judge, Locke, Durham & Kluger, 1998). The instrument contains eight items (of which four are negatively stated), which is scored on a five-point Likert scale, ranging in responses from 1 (*strongly disagree*) to 5 (*strongly agree*). Luszczynska, Scholz, and Schwarzer (2005) found evidence of internal consistency levels of $\alpha = 0.86$ in a South Korean and $\alpha = 0.90$ in a Polish study for the GSES. An example item for the GSES is “I am strong enough to overcome life’s struggles”.

Procedure

The research was conducted during a time of active competition, i.e. during a time of season when the participating athletes were actively involved in playing their sport. The research was conducted using the distribution of questionnaires to the participants in pre-arranged settings; immediately – or closely after a particular athletic event, such as a competitive game or a training session. Both rugby and football are team sports; hence participants were assembled in small groups to complete the research questionnaires in a pre-arranged venue conducive to the research process. Participants were briefed on the voluntary and confidential nature of the research and the research project leader was available to answer any questions the participants may have had.

Ethical Aspects

The study was subjected to all relevant ethical considerations. Firstly, proper permission was obtained by submitting the study for review by an ethics committee. The ethics application was approved and an ethics number was obtained (NWU-00108-14-S8). The study was done for research purposes only – no commercial gain was facilitated. The researchers obtained permission to utilise the various instruments. Permission was obtained by the management of the participating sport teams' organisations. Following the grant of permission, these organisations also made available a contact person to assist the lead researcher with the administration and logistics of the research process. The lead researcher administered the research questionnaires on site, in the various pre-arranged venues. The lead researcher explained in detail the research purpose, process and aim to the participants and informed them that the research was voluntary. Participants were also assured of the confidential nature of their responses. The entire procedure was explained on an information letter, as well as verbally, by the lead researcher. Although the project was classified as low risk and no potential psychological harm was foreseen, the lead researcher is qualified as a registered psychologist and was thus able to deal with any emerging discomfort participants may have experienced. The participants were also provided with the contact detail of the researcher, should they have required feedback or if they wished to raise any further questions.

Data Analyses

Analysis of the data was performed through the use of the statistical programme Mplus 7.31 (Muthén & Muthén, 1998-2014) and SPSS 22 (IBM Corp, 2013). Structural equation modelling was used to analyse the latent variable modelling postulated through the structural model. The majority of the variables in this study were measured through categorical indicators; hence unweighted least squares (ULSMV) method was applied to investigate the variance adjusted to ensure accurate estimation of standard errors (Savalei & Rhemtulla, 2012).

Akaike Information Criterion (AIC) and Bayes Information Criterion (BIC) were calculated using a robust maximum likelihood (MLR) estimator. AIC can be applied to compare measure of fit between different models, and the best fitting model of such competing models

is represented as having the lowest AIC value. As for model parsimony, Kline (2010) argues that BIC serves as the indicator for good model fit. As in the case of AIC, good model fit is also represented by the lowest BIC value for competing models. As for the structural model, it was tested through weighted least squares with mean and variance adjustment (WLSMV). According to Wang and Wang (2006), this is an applicable estimator for modelling categorical data as it does not assume normally distributed values. Indices used for absolute fit was the Chi-square value, the weighted root mean square residual (WRMR) and the root means square of approximation (RMSEA).

Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were used to determine incremental fit indices. Covariance explained by the hypothesised model is scrutinised through TLI, which is particularly useful for the assessment of factor models. Wang and Wang (2012) prescribe values for good model fit as above 0.90 for both CFI and TLI. This is disputed though by Hu and Bentler (1999), who recommend a cut-off value of at least 0.95. RMSEA accounts for the amount of error overall pertaining to the hypothesised model-data fit. It estimates this relative to the number of estimated parameters in the model and hence serves as indicator of model complexity. RMSEA should be 0.05 or less and should not exceed the level of 0.08, or good model fit cannot be proven. Hu and Bentler (1999) specify the RMSEA to not exceed 0.06. Chi-square tests were conducted to compare alternative structural models.

As an alternative to the traditional Cronbach alpha method, the reliability of the various scales were established by means of a formula based on the sum of squares of standardised loadings as well as the standardised variance of error terms. This is suggested by both Raykov (2009) and Wang and Wang (2012). It is incorporated because Cronbach alpha values do not provide a dependable estimate of scale reliability in studies where latent variable modelling is applied.

Results

Testing Measurement Models

Given the cross-sectional nature of the study, a competing models strategy was employed to test measurement as well as structural models.

Four competing measurement models were tested using confirmatory factor analyses (CFA) by Mplus. The first measurement model comprised four latent variables, namely a) athlete flow (measured by nine observed variables), b) communication (measured by four observed variables), c) teammate relationships (measured by six observed variables) and d) self-efficacy (measured by four observed variables). The second model comprised three latent variables, namely a) athlete flow (measured by nine observed variables), b) communication (measured by 10 observed variables and encompassing teammate relationships) and c) self-efficacy (measured by four observed variables).

The third measurement model had only one latent variable specified, that of well-being, measurement encompassing all the specified latent variables, namely flow, communication, teammate relationships and self-efficacy and measured by 23 observed variables. The fourth measurement model had three latent variables, namely a) athlete flow (measured by 13 observed variables and encompassing self-efficacy), b) communication (measured by four observed variables) and c) teammate relationships (measured by six observed variables). The fourth model was added due to the dimension of flow that alludes to a challenge and skill balance by Csikszentmihalyi (1990), which strictly speaking describes self-efficacy. Table 1 presents the results of these analyses.

Table 1

Fit Statistics for the Hypothesised Competing Measurement Models

Model	χ^2	<i>df</i>	TLI	CFI	RMSEA	WRMR	AIC	BIC
1	353.08	224	0.96	0.97	0.05	0.91	10325.74	10699.37
2	474.70	227	0.93	0.94	0.07	1.13	10420.04	10783.30
3	1369.47	230	0.68	0.71	0.15	2.23	10926.51	11279.39
4	684.94	227	0.87	0.88	0.09	1.48	10552.79	10916.05

χ^2 , chi-square statistic; *df*, degrees of freedom; TLI, Tucker-Lewis Index; CFI, Comparative Fit Index; RMSEA, root mean square error of approximation; WRMR, weighted root mean square residual

Model 1 showed good fit to the data based on the other indices, namely *df* = 224, $p < 0.001$, CFI = 0.97, TLI = 0.96, RMSEA = 0.05 (95% CI 0.039-0.059) and WRMR = 0.91. Statistically significant relationships were established between each observed variable. Table 2 reports the reliability and correlation coefficients of the scales utilised in this study.

Table 2

Reliabilities and Correlations of the Scales

Variable	Mean	<i>SD</i>	ρ	1	2	3	4
1. Flow	3.99	0.58	0.84	-	-	-	-
2. Communication	3.15	0.69	0.72	0.45	-	-	-
3. Teammate relationships	4.11	0.65	0.85	0.58	0.71	-	-
4. Self-efficacy	4.22	0.62	0.85	0.48	0.38	0.40	-

All correlations are statistically significant: $p < 0.01$

Reliability coefficients of all the scales in the study were acceptable ($\rho \geq 0.70$). Item 3 of the latent variable communication (“Is your sport team’s decision-making process clear to you?”) proved problematic and was thus discarded. Correlations of medium effect ($r \geq 0.30$) were found between communication and flow, self-efficacy and flow, communication and self-efficacy and teammate relationships and self-efficacy. Correlations of large effect ($r \geq 0.50$) were found between teammate relationships and flow as well as communication and teammate relationships.

Predicting Flow

The structural model proposed through the research was evaluated through a process of latent variable modelling. This was done with the assistance of the Mplus 7.3 (Muthén & Muthén, 1998-2014). Good fit was revealed through the results. Model estimation terminated normally and the following results were established: $\chi^2 = 3874.83$, $df = 231$, $p < 0.001$; RMSEA = 0.05 (90% CI: 0.036, 0.058), CFI = 0.97, TLI = 0.97, and WRMR = 0.875.

Subsequently, two other competing structural models were evaluated. Model 2 included paths from teammate relationships to flow and from self-efficacy to flow. The path from communication to flow was constrained to zero. Model 3 included paths from communication to flow and from self-efficacy to flow; while the path from teammate relationships to flow was constrained to zero.

Changes in chi-square ($\Delta\chi^2$) were found: For models 1 and 2; $\Delta\chi^2 = 0.17$, $\Delta df = 1$, $p < 0.6764$. For models 1 and 3; $\Delta\chi^2 = 11.85$, $\Delta df = 1$, $p < 0.0006$. Following this, it can be argued that model 1 fitted the data better than model 3. However, there were no significant differences between models 1 and 2. This finding confirms that communication did not contribute significantly to the prediction of flow experiences. Table 3 reveals the standardised path coefficients estimated by Mplus for structural model 1. This is in view of analysing the postulated structural paths between the variables communication, teammate relationships, self-efficacy and athlete flow, as per the hypothesised model.

Table 3

Standardised Regression Coefficients of Communication, Teammate Relationships and Self-efficacy in Predicting Flow

Variable	Estimate	SE	Est/SE	<i>p</i>
Communication	0.04	0.10	0.42	0.677
Teammate Relationships	0.43	0.09	4.60	0.000**
Self-efficacy	0.30	0.06	4.78	0.000**

** $p < 0.01$

Following Table 3, a positive effect of communication on flow is revealed, although not statistically significant ($\beta = 0.04$, $SE = 0.10$, $p = 0.677$). Hypothesis 1 is not supported. Paths from teammate relationships to flow were positive as well as statistically significant ($\beta = 0.43$, $SE = 0.09$, $p = 0.000$). Support for hypothesis 2 is thus established. From the perspective of the predicting properties of self-efficacy to flow, support for hypothesis 3 was found through a positive and statistically significant relationship revealed through the statistics above ($\beta = 0.30$, $SE = 0.06$, $p = 0.000$). The independent variables explained 41% of the total variance in flow. These results confirm the validity of the model.

Discussion

The aims of this study were to investigate whether the job resources of communication and teammate relationships can promote athlete flow; and investigate whether the personal resource of self-efficacy can promote athlete flow. Results revealed sufficient measurement- and structural model fit to the data, and indicated that teammate relationships and self-efficacy predicted athlete flow. It could not be conclusively proven that communication predicted flow in the context of this study.

This study was the first to explore whether the established JD-R model as proposed by Bakker et al. (2003) could be utilised to create environments that are conducive to athletes achieving flow experience and in this regard produced a novel indication to the body of flow literature. This idea was supported by this research, at least from the perspective of job resources and within the context of South Africa's two major sports, rugby and football. It supports the results of other studies that have investigated isolated, resource-related variables and interventions that have promoted flow experience of athletes; such as that of Lindsay et al. (2005) who effectively applied hypnosis to increase flow experiences amongst elite British cyclists; and that of Aherne, Moran, and Lonsdale (2011) who utilised extended mindfulness training interventions to promote the achievement of flow among track athletes. It provided firm support for the theory of Moreno, Cervelló, and González-Cutre (2010) who proposed that flow is a by-product of both a favourable environment and the inherent capitals of an individual, a central disposition of this paper.

This study further builds on the very limited number of studies that have successfully applied the JD-R model to sport, such as Stander and Mostert (2013), who investigated the effect of a number of job resources on the work engagement levels of sport coaches; and Pummel, Harwood, and Lavalley (2008), who found a relation between job resources made available through team relations and team spirit amongst a sample of event horse riders. From this perspective, this research addresses a major research gap and sets the foundation for an extended enquiry into which resources will promote athlete flow; and which resources will act as the strongest promoters of athlete flow; particularly from the perspective of positive psychology and within the framework of positive resources.

This relates to the COR theory of Hobfoll (1989). This theory suggests that, in order for individuals to mitigate factors that cause stress and achieve optimal experience states, these individuals will continuously search for and accumulate resources in their environment and within themselves (Grandey & Cropanzano, 1999). Gorgievski and Hobfoll (2008) argue that the COR is, at its core, a motivational theory, thus implying that an active and directed effort is made by the individual to accumulate an abundance of resources. These authors also hold that COR implies a sustained condition that enables certain favourable outcomes, such as flow. Thus a change in the resource levels, such as, in the context of this study, depletion in the rate of healthy teammate relations and communication levels, or lack of self-efficacy within the individual, will influence levels of well-being and negatively affect such a person's ability to achieve optimal experience states such as flow (Hobfoll, 2001).

When the structural paths of the specified hypothesised model were investigated, relationships with team mates revealed a statistically significant direct path to athlete flow. However, communication was not a significant predictor of flow when relationships with team mates were included in the regression analysis. To shed more light on this, the VBBA description of these two constructs should be scrutinised. Van Veldhoven et al. (2002) describe items on the communication dimension of the VBBA as very much concerned with information transference (e.g. "Are you adequately kept up-to-date about important issues within your sport team?" and "Is your sport team's decision-making process clear to you?"); hence it does not propose as deep a psychological experience and perception as teammate relationships, which reveals the need athletes have for meaningful interpersonal relationships to enhance the experience of their sporting activity (Choi, Cho, & Huh, 2013).

Communication in sport refers to a transactional exchange of information (Shernoff et al., 2014) and hence may not be directly related to the transformational properties associated with flow experience, especially if relationships between team members are considered at the same time.

Teammate relationships, as described through the VBBA, comprise a robust description of affinity and interdependence between members of a sport team (e.g. “Can you count on your teammates when you encounter difficulties?” and “In your team, do you feel appreciated by your teammates?”) and hence relates to the psychological need for relationships athletes have as human beings (Van Veldhoven et al., 2002). Considering this, it does make sense that healthy, prosperous relationships with teammates will enhance the probability of the athlete entering flow state, particularly when borne in mind that healthy teammate relationships will foster a meaningful team context in which the optimal state of flow can more readily be achieved (Elbe et al., 2010). This is due to the culture of trust that is facilitated through good teammate relationships (Moreno, Cervelló, & González-Cutre, 2010; Young, 2012).

The role and positioning of the JD-R model should be further scrutinised in relation to athlete flow, and research will benefit greatly by a comprehensive investigation and comparative study of the effect of different job resources on athlete flow experience. Further, the COR theory must be further applied to contextualise flow experience, particularly in view of the different motivational levels that exist in the investment of energy to accumulate resources and to utilise such resources towards flow experience. This paper serves as a useful foundation for such further exploration.

Considering the role of personal resources and its effect on the flow experience of athletes, this research revealed that self-efficacy could potentially directly predict athlete flow experience. The logical prediction would be that the description of self-efficacy by Luszczynska, Scholz, and Schwarzer (2005), namely that the individual holds an inherent belief that he/ she will be able to successfully complete a task, is in direct relation to Csikszentmihalyi’s (1990) flow dimension of a challenge and skill balance. It is also directly related to the dimension of control within flow, which implies that the individual exerts total power over the outcome of a particular activity when in flow (Csikszentmihaly, 1990). This supports the work of Jackson, Thomas, Marsh, and Smethurst (2001), who established that

the view of the self an individual athlete has, is a critical part of such athlete's ability to regularly enter flow state. It emphasises the view of Stavrou et al. (2007) which alludes to flow being a deeply personally felt optimal experience. When an individual has high levels of self-efficacy, that person holds the inherent belief that he/she will successfully achieve the desired athletic outcome, and is thus personally equipped - an important prerequisite for flow experience (Peifer et al., 2014).

Limitations of the Study and Suggestions for Future Research

A limitation of this study is the cross-sectional design thereof, rendering the possibility of common-method bias; through the nature of the instruments, which are designed as self-report questionnaires. A further challenge was the population investigated through this research – because a quantitative design was implemented, it was required to obtain a large number of responses. However, ultimately, a good representative sample was gathered because it comprised semi-professional student athletes who hold ambitions, and have realistic prospects, to play sport at a higher level. The study could have benefited from an even larger sample, particularly with the view of possibly investigating indirect effects between the latent variables. This, however, provides an opportunity for future research.

Ideally, in future, it would be beneficial to explore full-time professional athlete flow experience as a means of comparing the findings thereof with this study. However, this will prove challenging, seen from a quantitative perspective, as the available population of professional athletes is quite small compared to the larger sport participant population. This study also focused on football and rugby, excluding perhaps the insights available through incorporating other sporting codes. This is particularly relevant in South Africa where a large number of sports exist. The rationale on this occasion was to include the two major sport codes, both from a spectator and participatory perspective.

Future studies should expand on this research by further investigating other job- and personal resources that could potentially constitute environments that are conducive to the achievement of flow amongst athletes. This will support the application of the JD-R model in sport psychology and athlete flow experience specifically. The reason as to why communication could not conclusively be proven as a predictor of athlete flow should also be

scrutinised in future studies. Further, to provide a more robust understanding of flow from the perspective of the JD-R model, future studies may benefit by also incorporating job demands in its investigation of antecedents of flow.

Through this research, support was found for the reliability and validity of the FSS in a South African sport context. However, future research should further test this reliability and validity through psychometric evaluation across a large, representative demographic population, comprising more sporting codes and including both individual and team-based sport; and within the context of a full validation study. Also, future studies must be geared towards alternative measurements of flow as opposed to only the scale measurement of the experience traditionally utilised in the flow literature. This is because flow is a state, with dynamic properties. It can hence benefit to also design and implement qualitative measures to assess flow experience through a momentary impact approach, in other words measuring flow exactly there and at the time the athlete experiences it.

Conclusion

The research delivered both academic and practical value. Seen from an academic perspective, it substantiated for the application of the JD-R model within the realm of athlete flow and rendered the FSS reliable for use in the South African context. The research provided a foundation for two important future research directions in particular, namely the further exploration of job resources that could promote athlete flow experience and the investigation of the correlation between athlete flow and performance, especially from the perspective of incorporating self-efficacy. Seen from a practical perspective, the research indicated that interventions that promote healthy teammate relationships and self-efficacy could assist athletes in more readily achieving flow state.

In the case of teammate relationships it is proposed that sport teams and organisations actively introduce a culture in which trust exists, where there is healthy interdependence between team mates and where team members can rely on each other. This can be done through interventions at team level such as directed team-building exercises, as well as by clarifying roles and developing team cohesion. This will assist individual team members in achieving flow state. Furthermore, at individual level, self-efficacy should be promoted by

introducing personal developmental intervention. This supports the utilisation of expertise such as that of a sport psychologist who could facilitate means of promoting self-efficacy through a longitudinal developmental path which is embarked upon with the individual athlete. In conclusion, the research set up a foundation for the exploration of the JD-R model in athlete flow contexts, and specifically in the view of a positive psychological framework.

References

- Aherne, C., Moran, A. P., & Lonsdale, C. (2011). The effect of mindfulness training on athletes' flow: An initial investigation. *The Sport Psychologist*, 25, 177–189.
- Alvaro, C., Lyons, R. F., Warner, G., Hobfoll, S. E., Martens, P. J., Labonté, R., & Brown, R. E. (2010). Conservation of resources theory and research use in health systems. *Implementation science*, 5(79), 1–20.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22, 309–328.
- Bakker, A. B., Demerouti, E., Taris, T., Schaufeli, W. B., & Schreurs, P. (2003). A multi-group analysis of the job demands-resources model in four home care organizations. *International Journal of Stress Management*, 10, 16–38.
- Barker, J. B., Jones, M. V., & Greenlees, I. (2013). Using hypnosis to enhance self-efficacy in sport performers. *Journal of Clinical Sport Psychology*, 7, 228–247.
- Bruner, M. W., Munroe-Chandler, K. J., & Spink, K. S. (2008). Entry into elite sport: A preliminary investigation into the transition experiences of rookie athletes. *Journal of Applied Sport Psychology*, 20, 236–252.
- Carter, L., River, B., & Sachs, M. L. (2013). Flow in sport, exercise, and performance: A review with implications for future research. *Journal of Multidisciplinary Research*, 5(3), 17–31.
- Choi, H., Cho, S., & Huh, J. (2013). The association between the perceived coach-athlete relationship and athletes' basic psychological needs. *Social Behaviour and Personality*, 41(9), 1547–1556.
- Cornellisen, S., Bob, U., & Swart, K. (2011). Sport mega-events and their legacies: The 2010 FIFA World Cup. *Development Southern Africa*, 28(3), 305–306.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper & Row.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. (1988). *Optimal experience: Psychological studies of flow in consciousness*. New York, NY: Cambridge University Press.
- Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815–822.
- Dietrich, A. (2004). Neurocognitive mechanisms underlying the experience of flow. *Consciousness and Cognition*, 13, 746–761.

- Elbe, A. M., Strahler, K., Krstrup, P., Wikman, J., & Stelter, R. (2010). Experiencing flow in different types of physical activity intervention programs: Three randomized studies. *Scandinavian Journal of Medicine and Science in Sports*, 20, 111–117.
- Flores, J., Salguero, A., & Marquez, S. (2008). Goal orientations and perceptions of the motivational climate in physical education classes among Colombian students. *Teaching and Teacher Education*, 24, 1441–1449.
- Gano-Overway, L. A., Guivernau, M., Magyar, T. M., Waldron, J. J., & Ewing, M. E. (2005). Achievement goal perspectives, perceptions of the motivational climate and sportspersonship: Individual and team effects. *Psychology of Sport and Exercise*, 6, 215–232.
- Goodwin, C.J. (2009). E. W. Scripture: The application of “new psychology” methodology to athletics. In C. D. Green, & L. T. Benjamin, Jr. (Eds.), *Psychology gets in the game: Sport, mind, and behavior, 1880–1960* (pp. 78–97). Lincoln, Nebraska, NE: University of Nebraska Press.
- Gorgievski, M. J., & Hobfoll, S. E. (2008). Work can burn us out or fire us up: Conservation of resources in burnout and engagement. In J. R. B. Halbesleben, *Handbook of stress and burnout in health care* (pp. 1–22). Hauppauge NY: Nova Science Publishers.
- Grandey, A. A., & Cropanzano, R. (1999). The conservation of resources model applied to work-family conflict and strain. *Journal of Vocational Behavior*, 54, 350–370.
- Hakanen, J. J., Perhoniemi, R., & Toppinen-Tanner, S. (2008). Positive gain spirals at work: From job resources to work engagement, personal initiative and work-unit innovativeness. *Journal of Vocational Behavior*, 73(1), 78–91.
- Halbesleben, J. R. B., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the COR: Understanding the role of resources in conservation of resources theory. *Journal of Management*, 40, 1334–1364.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513–524.
- Hobfoll, S. E. (2001). Conservation of resources: A rejoinder to the commentaries. *Applied Psychology: An International Review*, 50, 419–421.
- Hobfoll, S.E., Johnson, R.J., Ennis, N., & Jackson, A.P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632–663.

- Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55.
- IBM Corp. (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, NY: IBM Corp.
- Inghilleri, P., Riva, G., & Riva, E. (Eds.). (2014). *Enabling positive change: Flow and complexity in daily experience*. Berlin: De Gruyter Open.
- Jackson, S. A. (1992). Athletes in flow: A qualitative investigation of flow states in elite figure skaters. *Journal of Applied Sport Psychology*, 4(2), 161–180.
- Jackson, S. A., & Eklund, R. C. (2002). Assessing flow in physical activity: The Flow State Scale-2 and the Dispositional Flow Scale-2. *Journal of Sport & Exercise Psychology*, 24, 133–150.
- Jackson, S. A., Eklund, B., & Martin A. (2010). *The FLOW Manual: The manual for the Flow Scales*. Queensland, Australia: Mindgarden.
- Jackson, S. A., Kimiecik, J. C., Ford, S. K., & Marsh, H. W. (1998). Psychological correlates of flow in sport. *Journal of Sport and Exercise Psychology*, 20, 358–378.
- Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The Flow State Scale. *Journal of Sport and Exercise Psychology*, 18, 17–35.
- Jackson, S. A., Thomas, P. R., Marsh, H. W., & Smethurst, C. J. (2001). Relationships between flow, self-concept, psychological skills, and performance. *Journal of Applied Sport Psychology*, 13, 129–153.
- Jones, R. A., Mahoney, J. W., & Gucciardi, D. F. (2013). On the transition into elite rugby league: Perceptions of players and coaching staff. *Sport, Exercise, and Performance Psychology*. Advance online publication. doi: 10.1037/spy0000013.
- Jowett, S., & Cockerill, I. M. (2003). Olympic medallists' perspective of the athlete-coach relationship. *Psychology of Sport and Exercise*, 4, 313–331.
- Judge, T. A., Locke, E. A., Durham, C. C., & Kluger, A. N. (1998). Dispositional effects on job and life satisfaction: The role of core evaluations. *Journal of Applied Psychology*, 83, 17–34.
- Kawabata, M., & Mallett, C. J. (2011). Flow experience in physical activity: Examination of the internal structure of flow from a process-related perspective. *Motivation and Emotion*, 35, 393–402.

- Kimiecik, J., & Harris, A. T. (1996). What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *Journal of Sport and Exercise Psychology, 18*, 247–263.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling*. New York, NY: The Guilford Press.
- Levermore, K., & Beacom, A. (2009). *Sport and international development*. Basingstoke, United Kingdom: Palgrave Macmillan.
- Lindsay, P., Maynard, I., & Thomas, O. (2005). Effects of hypnosis on flow states and cycling performance. *The Sport Psychologist, 19*, 164–177.
- Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The General Self-Efficacy Scale: Multicultural validation studies. *The Journal of Psychology, 139*, 439–457.
- Moneta, G. B. (2012). On the measurement and conceptualization of flow. In Engeser, S. (ed.) *Advances in flow research* (pp. 23–50). New York, NY: Springer.
- Moreno, J. A., Cervelló, E. and González-Cutre, D. (2010). The achievement goal and self-determination theories as predictors of dispositional flow in young athletes. *Anales de Psicología, 26*(2), 390–399.
- Muthén, L. K., & Muthén, B. O. (1998–2014). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Pates, J., & Maynard, I. (2000). Effects of hypnosis on flow states and golf performance. *Perceptual and Motor Skills, 91*, 1057–1075.
- Peifer, C., Schulz, A., Schächinger, H., Bauman, N., & Antoni, C. H. (2014). The relation of flow experience and physiological arousal under stress – can you shape it? *Journal of Experimental Social Psychology, 52*, 1–8.
- Pensgaard, A. M., & Roberts, G. C. (2002). Elite athletes' experiences of the motivational climate: The coach matters. *Scandinavian Journal of Medicine and Science in Sport, 12*, 54–68.
- Pummel, B., Harwood, C., & Lavallee, D. (2008). Jumping to the next level: A qualitative examination of within-career transition in adolescent event riders. *Psychology of Sport and Exercise, 9*, 427–447.
- Raykov, T. (2009). Evaluation of scale reliability for unidimensional measures using latent variable modeling. *Measurement and Evaluation in Counseling and Development, 42*, 223–232.

- Robinson, L. (2003). The business of sport. In B. Houlihan (Ed.), *Sport and society: A student introduction* (pp. 165–183). London, United Kingdom: Sage.
- Salkind, N. J. (2009). *Exploring research* (7th ed.). Englewood Cliffs, NJ: Pearson Prentice.
- Savalei, V., & Rhemtulla, M. (2012). The performance of robust test statistics with categorical data. *British Journal of Mathematical and Statistical Psychology*, 66(2), 201–223.
- Shaughnessy, J. J., Zechmeister, E. B., & Zechmeister, J. S. (2009). *Research methods in psychology* (8th ed.). New York, NY: McGraw-Hill.
- Shelangoski, B. L., Hambrick, M. E., Gross, J. P., & Weber, J. D. (2014). Self-efficacy in intercollegiate athletes. *Journal of Issues in Intercollegiate Athletics*, 7, 17–42.
- Sherhoff, D. J., Abdi, B., Anderson, B., & Csikszentmihalyi, M. (2014). Flow in schools revisited: Cultivating engaged learners and optimal learning environments. In M. J. Furlong, R. C. Gilman & E. S. Heubner (Eds.), *Handbook of positive psychology in schools* (2nd ed., pp. 131–145). New York, NY: Routledge.
- Stander, F. W., & Mostert, K. (2013). Assessing the organisational and individual strengths use and deficit improvement amongst sport coaches. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 39(2), 1–13.
- Stavrou, N. A., Jackson, S. A., Zervas, Y., & Karteroliotis, K. (2007). Flow experience and athletes' performance with reference to the orthogonal model of flow. *The Sport Psychologist*, 21, 438–457.
- Tenenbaum, G., Fogarty, G.J., & Jackson, S.A. (1999). The flow experience: A Rasch analysis of Jackson's Flow State Scale. *Journal of Outcome Measurement*, 3, 278–294.
- Van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, 9(4), 486–492.
- Van den Heuvel, M., Demerouti, E., Schaufeli, W.B., & Bakker, A.B. (2010). Personal resources and work engagement in the face of change. In J. Houdmont (Ed.), *Occupational health psychology, European perspectives on research, education and practice*, Vol. 4 (pp. 124–150). Chichester, United Kingdom: Wiley.

- Van Veldhoven, M., Meijman, T.F., Broersen, J.P.J., & Fortuin, R.J. (1997). *Handleiding VBBA: Onderzoek naar de beleving van psychosociale arbeidsbelasting en werkstress met behulp van de vragenlijst beleving en beoordeling van de arbeid* [Manual VBBA: Research on the experience of psychosocial workload and job stress by means of the Questionnaire on the Experience and Evaluation of Work]. Amsterdam, The Netherlands: SKB.
- Van Veldhoven, M., Meijman, T. F., Broersen, J. P. J., & Fortuin, R. J. (2002). *Handleiding VBBA* (2nd ed). Amsterdam, The Netherlands: SKB. PMCID:PMC1222642
- Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus*. Chichester, United Kingdom: Wiley.
- Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationship between job resources, personal resources and work engagement. *Journal of Vocational Behavior*, 74, 253–244.
- Young, J. (2012). Keys to effective communication with players. *Australian Tennis Magazine*, 37(2), 68–69.

CHAPTER 3

MANUSCRIPT 2

PATHWAYS TO FLOURISHING OF ATHLETES: THE ROLE OF TEAM AND INDIVIDUAL STRENGTH USE

Pathways to Flourishing of Athletes: The Role of Team and Individual Strength Use

Abstract

Information is needed regarding the antecedents and outcomes of flourishing, particularly in sports contexts, where the study of this optimal well-being state has remained largely unexplored. This study examined the role of strength use to facilitate flourishing, enhance team embeddedness and counter withdrawal behaviour of athletes. It further investigated the role of flourishing to retain athletes to their sport and teams and examined the role of team embeddedness in this relationship. A cross-sectional research design was utilised with structural equation modelling to assess model fit and examine postulated relationships. The sample comprised 235 student athletes. The results suggested that team strength use predicts flourishing. It further revealed positive paths to team embeddedness from both individual and team strength use. Flourishing was also positively related to team embeddedness. Lastly, a negative association was found between team embeddedness and withdrawal behaviour among the athletes.

Keywords: Flourishing, strength use, withdrawal behaviour, team embeddedness, athletes, sport

With the development of positive psychology as a discipline, scholars have increasingly become aware that mental health implies more than just the absence of pathology (Keyes, 2002). Instead, an epidemiology of subjective well-being has emerged that encompasses a broader implication than the absence of abnormality, towards an understanding that mental health entails positive emotions, health and optimal experience (Hone, Jarden, Schofield, & Duncan, 2014). In this regard, Keyes (2002) referred to mentally healthy people as “flourishing” individuals.

Flourishing – a condition that has been described as optimal human functioning – is directly linked to growth and resilience. It comprises three dimensions, namely emotional well-being, social well-being and psychological well-being (Keyes, 2005). Emotional well-being refers to positive affect, low negative affect and a general satisfaction with one’s life. Social well-being constitutes feelings of purposefulness in life, that one is making an active contribution to a community of people, drawing support from such community, holding the view that society can improve and being able to relate positively to others with a healthy attitude. Psychological well-being refers to individuals’ beliefs that their lives are heading in a clear direction, with a rich sense of meaning, experiencing new and challenging tasks, warm relations with others, accepting the self in totality, having capacity for intimacy and empathy, self-directing one’s life in a positive direction and being able to manage complex challenges in a continued context of positive self-development. These experiences are viewed as optimal human functioning (Fink, 2014; Keyes, 2002, 2005).

It has been established that as little as 17.2% of adults are in a state of flourishing in their lives (Keyes, 2002). In a study in the United States of America, less than 20% of the adult population was assessed to be in a state of flourishing (Keyes, 2007). This is also true of other parts of the world, where it emerged that the majority of the population do not flourish in their everyday lives (Keyes & Annas, 2009; van Zyl & Rothmann, 2012). Fundamentally, research is required to understand the antecedents of optimal functioning in a responsible effort to enhance the levels of flourishing of people (Seligman, 2011). Psychology must establish ways in which flourishing can be actively promoted and must put forward practical suggestions to create contexts in which this optimal human state can be achieved (Younkins, 2010). Therefore, it is necessary to investigate means, methods and interventions to promote the experience of flourishing in different populations (Nelson & Padilla-Walker, 2013). This

study will bring the principles of the positive psychology to fruition, ensure that a higher percentage of people function on the upper end of the mental health continuum and combat the prevalence of mental ill-health of people over the long run (Diedericks & Rothmann, 2013; Keyes, Satvinder, Dhingra, & Simoes, 2010). Schools of thought such as the broaden-and-build theory (Fredrickson, 2002) and the happy-productive worker thesis (Taris & Schreurs, 2009) argue that flourishing will yield value at both a personal and work-related level. A more comprehensive understanding of the factors that lead to flourishing will equip scholars and practitioners to develop a larger fraternity of the population into flourishing human beings. Flourishing people display positive functioning in life (Keyes, 2007), and generally report the lowest levels of perceived helplessness, highest levels of learning from adversity, and high levels of intimacy in their relationships with others (Diedericks & Rothmann, 2013; Keyes, 2007).

One of the contexts for experiencing flourishing that remains particularly unexplored is sport. Penedo and Dahn (2005) established that involvement in sport led to higher general and health-related quality of life, better functional capacity and mood states. Malebo, Van Eeden, and Wissing (2007) found that athletes in general experience lower levels of negative affect, somatic symptoms, symptoms of depression and pessimistic life orientation; as well as higher levels of positive affect, sense of coherence and self-efficacy. The skill set required and challenges presented by sport simulate an environment to learn enhanced self-control and attribution style for general life functioning (Shachaf & Katz, 2014).

Although studies relate sport to elements of well-being and improved functioning, little is known about the prevalence of the holistic model of flourishing of individuals in the sport and athletic community. To this extent, two research gaps exist. Firstly, coherent with the general positive psychology, it is important to explore the antecedents of flourishing, in this case in the context of sport. Secondly, it is necessary to examine the outcomes of flourishing in sport, i.e. to better understand the value flourishing yields for the individual. In this study, we assess the role of following a strength-based approach as a possible antecedent of athlete flourishing levels. Subsequent to this, we examine whether the experience of flourishing will lead to a decreased likelihood of the athlete withdrawing from his/her team and sport. Finally, the role of the embeddedness of the athlete in his/her team to counter such withdrawal behaviour is investigated.

Strength Use and Flourishing of Athletes

The strength-based approach is a school of thought that has emerged in the positive psychology. The strength-based approach states that the expansion of talents and virtues of people is equally important for their development as is the rectification and redressing of their deficits (Linley, Joseph, Harrington, & Wood, 2006). The strength-based approach is a developmental approach that seeks the utilisation of individuals' character strengths; unique virtues and potentialities nestled within such individual that assists him/her to enjoy optimal experience, negotiate difficult tasks and attain personal development (Seligman & Csikszentmihalyi, 2000; Wood, Linley, Maltby, Kashdan, & Hurling, 2011). An individual's strengths energise him/her towards achieving goals and pursuing challenging tasks (Linley et al., 2006).

The strength-based approach is far removed from traditional developmental approaches, which has sought to rectify deficiency, flaw and abnormality - towards an inclination of accentuating what people are good at in an effort to amplify these character strengths and attain full fruition of potential (Kaiser & White, 2009). The strength-based approach offers a balanced approach, complementing the rectification of areas of deficiency with the bolstering of a person's unique potentialities, hereby ensuring holistic development (Buckingham & Clifton, 2001). The strength-based approach is constituted by two distinctive dimensions, namely organisational (or team) strength use (TSU), and individual strength use (ISU) (Botha & Mostert, 2014; Van Woerkom et al., in press; Stander & Mostert, 2013, Stander, Diedericks, Mostert, & de Beer, 2015).

TSU refers to the contextual enablement of individuals' strengths by the organisation or team they are embedded into (Els et al., in press). It describes the extent to which the culture, policies and dynamics of a team are favourable to permit such individual to express his/her strengths (Standar & Mostert, 2013). TSU is conceptualised as an asset available in the direct environment of the individual, assisting such individual to navigate challenges and making the attainment of goals more possible (Bakker & Demerouti, 2008; Demerouti & Bakker, 2011).

ISU refers to the proactive and inherent capacity of a person to utilise his/her strengths to achieve optimal development (Stander et al., 2015). ISU is a critical component to realise full potential as it assists the individual to persevere in the face of trial and cultivates resilience (Frese & Fay, 2001). ISU It forms part of the inherent capitals which are “aspects of the self-linked to resiliency” (Hobfoll, Johnson, Ennis, & Jackson, 2003, p. 632). Thus, while TSU refers to an environmental context that is conducive to strength use of individual team members, ISU is direct inherent capital that moves a person to develop actively – and capitalise on strengths.

Gordon and Gucciardi (2011) reported an enhanced level of mental toughness facilitated in a team of professional Sri Lankan cricket players by introducing strength-based group coaching. Golby and Sheard (2004) established that strength-based psychological skills training initiatives amplified the psychological hardiness of professional rugby league players in Britain. Gould, Dieffenbach, and Moffet (2002) successfully utilised strength-based development workshops to develop psychological skills required for competition, hereby enhancing the likelihood of success of Olympic athletes. The strength-based approach offers a valuable approach to the often challenging and ever changing sport environment athletes have to compete in as it buffers against stressors in the environment and enables the athlete to more readily achieve goals (Wagstaff & Leach, 2015).

Research has thus far focused on understanding the effects of isolated strength-based interventions on specific athlete outcomes, usually related to performance (Golby & Sheard, 2004; Gould et al., 2002; Wagstaff & Leach, 2015). It will be valuable to examine the effects of an integrated strength-based approach, comprising both the TSU and ISU dimensions, on the holistic well-being and functioning of athletes. This will assist us in comprehending whether and how environments and individual capacities can be developed to enhance optimal realisation of potential, particularly in sport contexts (Stander, Rothmann, & Botha, 2015). In this study, the role of strength-use in predicting flourishing of athletes is examined.

In theory, the strength-based approach has often been related to flourishing, because it proposes a meaningful engagement with life (Seligman, 2011). Rothmann (2013, p. 127) describes such engagement in the context of its properties of flourishing. He stated that “engagement results from knowing what your signature strengths are and recrafting your life

to use them at work, in leisure, in parenting, and with friendships. Meaning and purpose exist when you know what your highest strengths and talents are and you use them in the service of something you believe is bigger than you are". The strength-based approach is geared towards bringing to the fore what is best in people, developing individuals towards the optimal expression of potential and hereby contributing to flourishing (Stander et al., 2015). It proposes the full manifestation of talents (Kaiser & White, 2009; Park, Peterson, & Ruch, 2009).

Several theories can be used to explain the relationship between the strength-based dimensions and flourishing. From the perspective of TSU, conservation of resources (COR) theory (Hobfoll, 1989) proposes that individuals will actively seek resources in their direct environment that assist them to be more efficient and achieve goals. People will protect, develop and try to enhance the availability of these resources in their environment (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). Further to this, social exchange theory (Blau, 1964) proposes that people expect the environments they operate in to provide for their development. Athletes embedded into sport teams that seek to utilise and promote their character strengths are likely to experience flourishing.

The second dimension of strength-based approach, namely ISU, is also related to flourishing. This relation is based on the Values-in-Action (VIA) framework of Park, Peterson, and Seligman (2004). The VIA proposes that every person has unique inherent signature strengths, manifested as unique, which, when encouraged and developed, will lead to the optimal expression of potential. Also in the PROSPER model of Noble and McGrath (2015) the use of individual character strengths is a crucial prerequisite for the experience of comprehensive well-being. The sport context should not be different from everyday life. Athletes, who have the inherent predisposition to seek, promote and utilise their character strengths, should be better positioned to experience flourishing.

Strength Use, Flourishing, Team Embeddedness and Withdrawal Behaviour

The second research objective of this study relates to the relationship between athletes' strength use, flourishing and withdrawal behaviour. Withdrawal behaviour, often referred to as turnover intention in the literature, describes an individual's conscious and deliberate

purpose to leave a group, team, organisation or activity (Tett & Meyer, 1993). It represents a wilful decision on the part of such individual to leave the team he/she is part of when an opportunity arises (Emberland & Rudmo, 2010). We propose that individuals flourish because of resources offered to them in the sport team environment (TSU) and inherent capitals available to them (ISU). Flourishing athletes will be less prone to leave their team or the athletic activity itself.

A culture which promotes the utilisation of individual team members' strengths will be conducive to ensure such members remain part of the sport team. A culture of team strength use is a favourable condition for optimal expression of potential, which leads to higher levels of satisfaction and in turn facilitates a greater likelihood of sustaining participation in such team (Tett & Meyer, 1993). In most cases, athletes are highly attuned to interventions and contexts that actively promote their performance and optimal expression of their potential. Eime, Young, Harvey, Charity, and Payne (2013) argue that athletes prioritise being part of a team that allows them to use their strengths and value a team culture that provides support for such utilisation. When such a supportive environment exists, optimal functioning becomes possible. The reason for this is that teammates can draw on the backing of each other to successfully realise their goals (Flores, Salguero, & Márquez, 2008).

According to social exchange theory (Blau, 1964), perceived social support for strength utilisation results in athletes being less likely to consider leaving a team. Athletes want to gain the highest possible value from their sport team and are most satisfied when the team environment provides a platform to them to pursue goals without fear of failure (Moreno, Cervelló, & González-Cutre, 2010). This is in line with Conservation of Resources theory (Hobfoll, 1989). Should athletes experience that teams do not allow them to express their strengths, they will seek another team or quit the athletic activity altogether.

The idea that ISU will counter withdrawal behaviour is also defensible from the literature. The VIA framework proposes that individuals that utilise their unique character strengths will be more resilient and better equipped to be effective in the environments in which they operate (Park et al., 2004; Peterson, Park, & Seligman, 2005; Ruch, Proyer, Harzer, Park, Peterson, & Seligman, 2010; Seligman, 2011). According to the PROSPER model, these individuals will function at the optimum psychological level more frequently and experience

the activities they participate in as meaningful and rich in purpose (Noble & McGrath, 2015). ISU will assist athletes to persevere and prosper in their sport teams. This is due to the power of personal resources in creating favourable outcomes for athletes. Personal resources equip the athlete to retain motivation to realise sport goals. It also enables athletes to persist in this pursuit even when they endure challenging circumstances (Barker, Jones, & Greenlees, 2013).

Jackson (1996) has found that when optimal experience states are generated through sport participation, athletes will likely seek the opportunity of participating repetitively in such sport and will sustain their involvement over prolonged periods of time. When an athlete's well-being is positively affected by sport participation, such an athlete will experience his/her sport as intrinsically rewarding and will likely not withdraw from it (Petosa & Holtz, 2013). A sport participant, who believes his/her well-being is enhanced through his/her sport, will purposefully invest effort to participate in such sport, will seek opportunities to interact with his/her sport team and will display behaviours of exercise adherence (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). The explanation for this is found in the concept of the broaden-and-build theory of Fredrickson (2002). This theory holds that, when positive emotions and experiences are generated by performing a particular activity, thought-action repertoires result and cause the individual to consistently seek such experiences. This leads to sustained well-being over the long run.

Much has been written about the value individuals derive from being in a sports team. Spaaij and Anderson (2010) comment that a sports team provides a shared identity to its members. According to Joesaar, Hein, and Hagger (2011), a sport team provides its members with peer support, intrinsic motivation and relatedness needs satisfaction which moves the members of such a team to commit to the team. The social value offered through a sport team is significant and offers the team members the opportunity of interacting on a platform which is enjoyable, provides challenge and enhances self-esteem (Eime et al., 2013). It is these benefits that counter withdrawal behaviour and motivates members of a sport team to commit their efforts and energy to the team for a long term.

Embeddedness is a relatively new concept in the turnover intention literature and forms part of the Job Embeddedness (JE) theory (Zhang, Fried, & Griffeth, 2012). JE theory argues that

there is a broad range of indicators that influence people's decision to stay with a particular team, i.e. links, fit and sacrifice (Lee, Mitchell, Sablinski, Burton, & Holtom, 2004; Mitchell, Holtom, Lee, Sablinski, & Erez, 2001). Links refer to the formal or informal interconnectedness that exists directly between members of a team, or between team members and the culture, institutions or outside influences in a team environment (Lee et al., 2004; Mitchell et al., 2001). If the perceived links are strong, members of that team are more embedded in that team and are less likely to leave it. Fit describes the sense of compatibility with a team that team members have. Fit refers to how values are aligned, whether the team member feels his/her personality fits and contributes to the team. It includes perceptions of whether parity exists between the identity of the individual member and the team as a whole (Lee et al., 2004; Mitchell et al., 2001). Should such fit be high, the team member will strongly affiliate with that team and is less likely to withdraw his/her participation from the team. Sacrifice is the embeddedness dimension that describes the extent to which a team member will perceive loss when he or she leaves the team (Lee et al., 2004; Mitchell et al., 2001). Cost, in this sense, is a broad term, which can refer to financial loss, and loss of opportunity for social interaction. It also refers to some other psychological, pragmatic or social costs that will emerge, should that member withdraw participation from the team. A team member can be described as embedded in the team if such perceived cost moves the team member to sustain involvement within that team.

As far as the relationship between strength use and embeddedness is concerned; we argue that both strength use dimensions would predict embeddedness. From the perspective of TSU, a team culture that draws on the virtues of its members will facilitate a conducive and productive team environment that members will experience as rewarding (Stander & Mostert, 2013). It is likely that the positive and uplifting nature of a TSU culture will create cohesion and affinity between team members and enhance the bonds existing between team members (Stenseng, Forest, & Curran, 2014). ISU will also enhance embeddedness, as individuals who proactively capitalise on their strengths would feel more inclined to draw on their potentialities and feel part of a team (Noble & McGrath, 2015).

The association between flourishing and team embeddedness is also postulated to be positive. This positive relation is supported in the flourishing literature. Flourishing individuals can relate more positively to others (Diedericks & Rothmann, 2013), and have the ability to

contribute to and be effective in group contexts (Keyes, 2005). They are inclined to seek meaningful interactions with other people (Fink, 2014; Keyes, 2002, 2005). These attributes are at the heart of the dimensions of team embeddedness as outlined by Lee et al. (2004).

Embeddedness is widely considered to be a direct counter to withdrawal behaviour. When a team member experiences relatedness in the team, compatibility with its context, and high costs associated with leaving, he/she will be less likely to withdraw from the team (Zhang et al., 2012). A healthy team environment provides the platform for relatedness, growth and development of its members and as such is a significant contributor to counter intention to leave that team (Stenseng et al., 2014).

Aim and Hypotheses

This study has three aims. First, the properties of team- and individual strength use as a predictor of flourishing of athletes are investigated. Second, team and individual strength use and flourishing are explored in relation to withdrawal behaviour. Finally, the effects of team embeddedness on withdrawal behaviour are examined. Based on the literature outlined above this paper postulates that:

Hypothesis 1 : Team strength use is positively associated with the flourishing of athletes.

Hypothesis 2 : Individual strength use is positively associated with the flourishing of athletes.

Hypothesis 3 : Team strength use is negatively associated with withdrawal behaviour of athletes.

Hypothesis 4 : Individual strength use is negatively associated with withdrawal behaviour of athletes.

Hypothesis 5 : Team strength use is positively associated with the team embeddedness of athletes.

Hypothesis 6 : Individual strength use is positively associated with the team embeddedness of athletes.

Hypothesis 7 : Flourishing is positively associated with team embeddedness of athletes.

Hypothesis 8 : Flourishing is negatively associated with withdrawal behaviour of athletes.

Hypothesis 9 : Team embeddedness is negatively associated with withdrawal behaviour of athletes.

Hypothesis 10: Team embeddedness moderates the relation between flourishing and withdrawal behaviour of athletes

Figure 1 presents the research model.

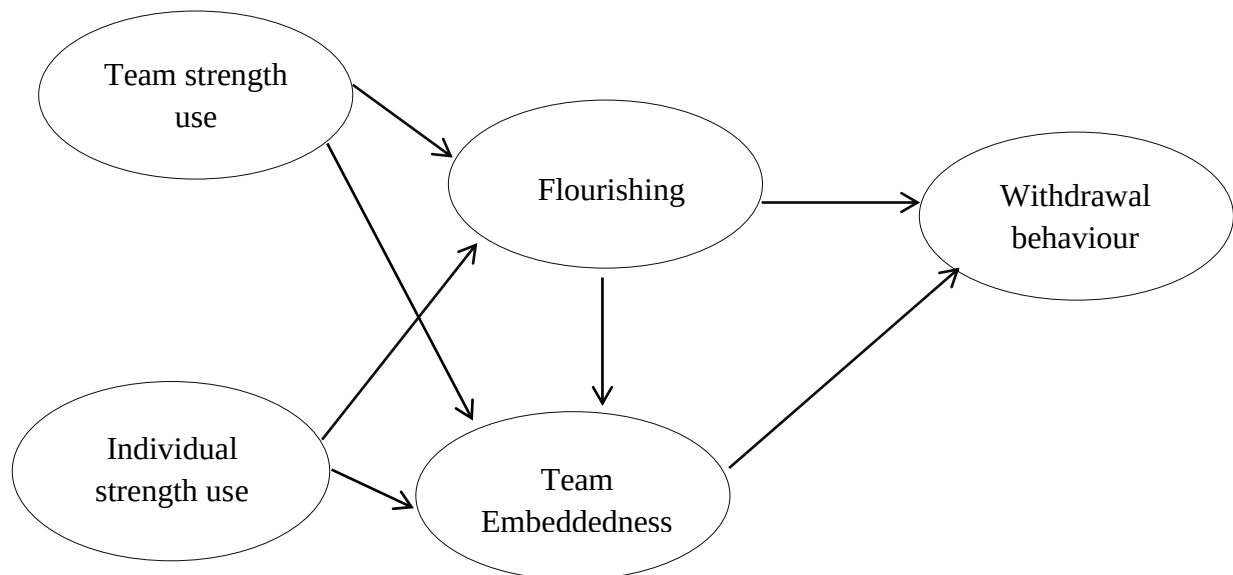


Figure 1. The research model

Method

Research Design

A cross-sectional research design was implemented, meaning responses were gathered during a specified time from the research participants (Salkind, 2009). This study was exploratory and descriptive. A quantitative research approach was followed.

Participants and Setting

Student athletes were engaged for the purpose of this study. A total sample of 235 student athletes, participating in South Africa's two most prominent sports, football and rugby, participated in the study. Convenience sampling was implemented to assemble participants. A criterion was developed which participants had to adhere to for them to be included in the study.

All participants had to adhere to the following criteria to be included in the study:

- Had to receive a form of compensation for their participation in sport (for example through a bursary, small salary or allowance) at the time of the research.
- Had to be actively involved in another significant time-consuming activity, such as work or study, alongside their sport participation at the time of the research.

This criterion ensured that the student-athletes that participated in the study were serious about their participation in sport and had a realistic chance of participating in sport professionally in the future. An overview of the characteristics of the participants in this study is provided below.

Table 1
Characteristics of the Participants (N = 235)

Item	Category	Frequency	Percentage
Gender	Male	173	73.6
	Female	62	26.4
Race	African	103	43.8
	White	114	48.5
	Coloured	18	7.7
Sport	Football	167	71.1
	Rugby	68	28.9

The research was conducted during the active season of the two sports. The participating athletes were from two separate campuses of a university. It was possible to cluster participants into nine different teams. The research project leader administered the instruments on pre-arranged times and in pre-arranged venues; which were arranged with the permission and assistance of the management teams of the respective teams, as well as a gatekeeper at the two different universities. Administration of the questionnaires followed shortly after an event of active participation, such as a training session or sports game. The nature, purpose and detail of the research were explained to participants, who were afforded the opportunity of asking questions on any aspect of which they were uncertain. An informed consent letter was also attached to the instruments, outlining the entire research process. Participation was voluntary and all responses were kept confidential. Participants were given the opportunity of withdrawing during any stage of the research procedure. The research

project leader collected completed instruments and stored them for safe keeping in a secure storing facility.

Measuring Instruments

A biographical questionnaire was used to obtain information concerning the biographical features of participants (e.g. age, gender, level of qualification and home language). The subsequent measuring instruments were administered:

Strength use. The team strength use (TSU) and individual strength use (ISU) dimensions of the strength-based approach were assessed with the Strength Use and Deficit Improvement Questionnaire (SUDIQ; Els et al., in press). Both dimensions were measured by four items, scored on a seven-point frequency scale ranging from 0 (*almost never*) to 6 (*almost always*). An example item for TSU is “My sport team allows me to use my talents”. An example item for ISU is “In my sport I make the most of my strong points”. The SUDIQ has been proven reliable in a number of studies (Botha & Mostert, 2014; Els et al., in press; Stander & Mostert, 2013; Stander, Mostert, & De Beer, 2014). Stander et al. (2014) established internal consistency of 0.94 (TSU) and 0.93 (ISU) for the two strength-based approach dimensions through Cronbach alpha values.

Flourishing. Flourishing was measured by means of the *Mental Health Continuum - Short Form* (MHC-SF; Keyes, 2009). This measure comprises 14 items that represent the three dimensions considered as theoretical components of flourishing, namely emotional, social and psychological well-being. Emotional well-being is assessed by the example item that asks the respondent to rate how frequently he/she has felt interested in life. Social well-being is for example measured through enquiring how often the respondent felt he/she had something important to contribute to society. Psychological well-being is measured by the example item that explores the frequency that a respondent has felt purpose/ sense of direction in his/her life. The instrument is scored on a six-point frequency scale on responses ranging from *never* to *every day*. Internal consistency of the MHC-SF has been established in various studies (Keyes, 2009).

Withdrawal behaviour. Withdrawal behaviour was measured with an adapted version of the *Turnover Intention Scale* (TIS-6; Bothma & Roodt, 2013), a shorter version of the 15-item scale initially developed by Roodt (2004). This measure has six items and is measured on a six-point frequency scale. An example of an item is “How often have you considered leaving your sport team?” Bothma and Roodt (2013) have reported internal consistency of 0.80 for the TIS-6. The instrument is scored on a five-point frequency scale from 1 (*never*) to 5 (*always*).

Embeddedness. Embeddedness in team was measured by the *Job Embeddedness Scale* (JES; Mitchell et al., 2001), adapted specifically for the sport team context. The short version of this scale, comprising seven items (of which the negatively scored item was discarded) was applied in this research. The scale measures all three dimensions of embeddedness. An example item for links is “Many members of my team are dependent on me”. An example item for fit is “I fit with my team’s culture”. Sacrifice is for example measured through the item “I would sacrifice a lot if I left my team”. Responses are scored on a Likert scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). In a recent study in the South African context, van Dyk, Coetzee, and Takawira (2014) established overall internal consistency of 0.91 for the JES through Cronbach alpha coefficients.

Statistical Analysis

Mplus 7.31 was used to analyse the data gathered through this study (Muthén & Muthén, 1998-2014). The latent variables identified as part of the structural model were analysed through structural equation modelling. A robust maximum likelihood indicator was used to determine Akaike Information Criterion (AIC) and Bayes Information Criterion (BIC). AIC is used to compare measure of fit between different postulated models, where the lowest AIC value is considered the best fit. BIC serves as an indicator of good model fit in terms of model parsimony (Kline, 2010). The lowest BIC value is also indicative of best fit. Indices used for absolute fit was the Chi-square value, the standardised root mean square residual (SRMR) and the root means square of approximation (RMSEA). Incremental fit indices were determined using Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI). TLI is used for covariance explained by the hypothesised model. In terms of good model fit, Wang and Wang (2012) recommend values of 0.90 or higher for both CFI and TLI. Hu and Bentler

(1999), however, has argued this value must be at least 0.95. RMSEA values describe error overall in the hypothesised model data fit. It is an indicator of model complexity. Both RMSEA and SRMR values lower than 0.08 indicate a close fit between the model and the data. Chi-square tests were used to compare the structural models.

Descriptive statistics were computed using SPSS (IBM Corp, 2013). Reliability of the scales was determined by means of a formula based on the sum of squares of the standardised loadings and variance of error terms. This is a preferred method to the traditional Cronbach alpha method (Raykov, 2009; Wang & Wang, 2012). Cronbach alpha values do not provide for accurate estimation of scale reliability where latent variable modelling is applied. Effect sizes were used to decide on the practical significance correlations. The cut-off values for practical significance are as follows: small effect ($r < 0.30$), medium effect ($r > 0.30$), or large effect ($r > 0.50$; Cohen, 1988).

Results

Measurement Models

Considering the cross-sectional nature of the study, competing measurement models were tested. The same applied to the structural models. In terms of the measurement models, four different models were considered using confirmatory factor analysis (CFA).

The first measurement model consisted of the following latent variables: a) Flourishing, consisting of three latent variables, namely emotional well-being (measured by means of three observed variables), psychological well-being (measured by means of six observed variables), and social well-being (measured by means of five observed variables); b) Team strength use (measured by means of four observed variables); c) Individual strength use (measured by means of four observed variables); d) Team embeddedness (measured by means of six observed variables), e) Withdrawal behaviour (measured by means of five observed variables). The others models followed the same template but with some differences in terms of specification: The second model comprised flourishing as a one-factor construct, but the remaining part of the model was the same as model 1. Model 3 was congruent with model 1, except that strength use (team and individual) was modelled as a single latent variable.

Finally, model 4 specified all the observed variables as part of a single latent variable. Table 2 shows the results.

Table 2

Fit Statistics for the Hypothesised Competing Measurement Models

Model	χ^2	<i>df</i>	TLI	CFI	RMSEA	SRMR	AIC	BIC
1	759.81	482	0.92	0.93	0.05	0.06	19731.98	20119.45
2	818.26	454	0.89	0.90	0.06	0.06	19435.92	19802.63
3	935.20	455	0.85	0.87	0.07	0.07	19577.50	19940.76
4	834.88	455	0.89	0.89	0.06	0.06	19452.85	19816.11

χ^2 , chi-square statistic; *df*, degrees of freedom; TLI, Tucker-Lewis Index; CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardised Root Mean Square Residual

Evident from above, model 1 showed good fit to the data based on the other indices, namely $\chi^2 = 759.81$, $df = 482$, $p < 0.001$, CFI= 0.93, TLI = 0.92, RMSEA = 0.05 (95% CI 0.043-0.056) and SRMR = 0.06, AIC = 19731.98 and BIC = 20119.45.

Analyses continued in an exploratory mode to improve the fit of the selected model. The standardised residual (SR = 5.79) of item 2 (“Many members of my team are dependent on me”) and item 3 (“I like the members of my team”) of the JES was higher than 2.58 (Byrne, 2010). Therefore the model was re-specified without item 3. The fit statistics for the revised model (model 6) showed that the model fit improved significantly when the one item was removed: $\chi^2 = 680.75$, $df = 451$, $p < 0.001$, CFI= 0.94, TLI = 0.93, RMSEA = 0.05 (95% CI 0.043-0.056) and SRMR = 0.06, AIC = 19267.80 and BIC = 19644.90. Standardized coefficients from items to factors ranged from 0.57 to 0.86. Furthermore, the results indicated that the relationship between each observed variable and its respective construct was statistically significant ($p < 0.01$), establishing the posited relationships amongst indicators and constructs (see Hair, Black, Babin, & Andersen 2010).

Descriptive Statistics, Correlations and Reliabilities

Reliability and correlation coefficients are reported below in Table 3.

Table 3

Descriptive Statistics, Reliabilities and Correlations of the Scales

Variable	Mean	SD	ρ	1	2	3	4
5. Flourishing	3.90 (0-5)	0.83	0.94	-	-	-	-
6. Team strength use	5.13 (1-6)	0.94	0.92	0.54	-	-	-
7. Individual strength use	5.13 (1-6)	0.94	0.89	0.46	0.62	-	-
8. Team embeddedness	4.89 (1-6)	0.89	0.85	0.61	0.63	0.57	-
9. Withdrawal behaviour	2.12 (1-5)	0.96	0.81	-0.42	-0.43	-0.27	-0.49

All correlations are statistically significant: $p < 0.01$

Reliability coefficients of all the scales in the study were established to be acceptable ($\rho \geq 0.70$). Correlations of medium effect ($r \geq 0.30$) were found between individual strength use and flourishing, flourishing and withdrawal behaviour, team strength use and withdrawal behaviour and team embeddedness and withdrawal behaviour. The latter three correlations in the afore-mentioned were all negative. Correlations of large effect ($r \geq 0.50$) were found between team strength use and flourishing, team embeddedness and flourishing, team strength use and individual strength use, team strength use and team embeddedness and individual strength use and team embeddedness. Table 4 below provides descriptive statistics at the levels of flourishing the athletes that participated in the study had experienced, distinguishing between flourishing participants, moderately flourishing participants and languishing participants.

Table 4

Three Category Diagnosis of Flourishing of Participants (N = 235)

Category	Frequency	Percentage (%)
Languishing	4	1.70
Moderate	64	27.20
Flourishing	167	71.10

Evident from the above, the majority of participants experienced high levels of flourishing. A small minority of participants were in a state of languishing. Figure 2 shows the scores of the participants on the 14 symptoms of flourishing.

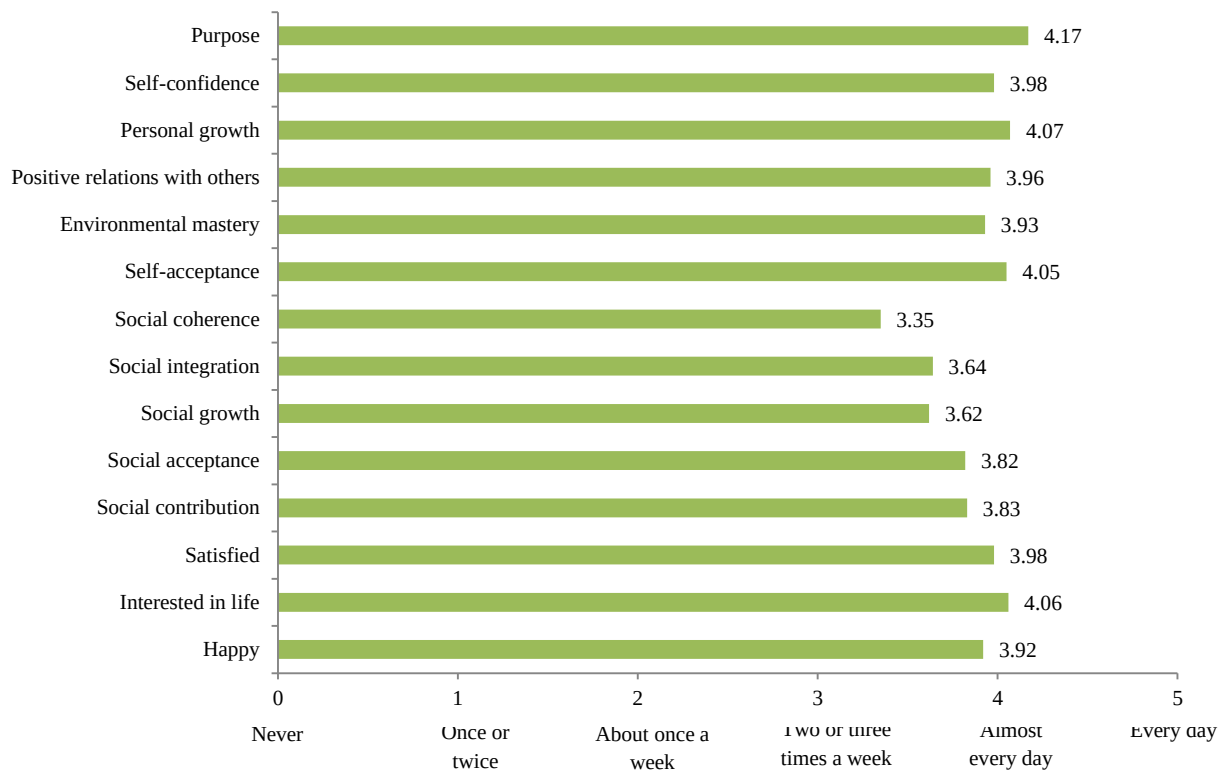


Figure 2. Mean frequency of components of mental health in the past month

Figure 2 shows that the highest scores in terms of flourishing were obtained for purpose, personal growth, interest in life, and self-acceptance. The lowest scores were recorded on two items of social well-being, namely social coherence and social growth.

Structural Models

Structural models were assessed based on the measurement model delineated above. Given the cross-sectional nature of this study three competing structural models were compared. Model 1 (the direct and indirect effects model) included paths from team strength use to flourishing, from individual strength use to flourishing, from team strength use to withdrawal

behaviour, from individual strength use to withdrawal behaviour, from flourishing to withdrawal behaviour and from team embeddedness to withdrawal behaviour.

Model 2 (the indirect effects model) was similar to model 1, but the paths from team and individual strength use to team embeddedness and withdrawal behaviour were constrained to zero.

Model 3 (the direct effects model) was also similar to model 1, but the paths from team and individual strength use to flourishing and team embeddedness were constrained to zero. Table 5 displays the fit statistics and standardised regression coefficients for the three competing structural models.

The following changes in chi-square ($\Delta\chi^2$) were found: Models 1a and 1b ($\Delta\chi^2 = 34.27$, $\Delta df = 4$, $p < 0.01$), models 1a and 1c ($\Delta\chi^2 = 114.40$, $\Delta df = 5$, $p < 0.01$), and models 1b and 1c ($\Delta\chi^2 = 47.02$, $\Delta df = 1$, $p < 0.01$).

The AIC and BIC values of model 1a were also substantially lower than the values for models 1b and 1c. Model 1, comprising paths from team strength use to flourishing, from individual strength use to flourishing, from team strength use to withdrawal behaviour, from individual strength use to withdrawal behaviour, from flourishing to team embeddedness and from team embeddedness to withdrawal behaviour, proved to be the best fit of the compared models and also revealed good fit statistics $\chi^2 = 680.75$, $df = 451$; $p < 0.001$; CFI = 0.94; TLI = 0.93; RMSEA = 0.05 [90% CI 0.04, 0.05]; SRMR = 0.06.

Table 5 reports the structural paths between the variables. Statistically significant paths were established between team strength use and flourishing ($\beta = 0.41$, $SE = 0.11$, $p < 0.01$). Hypothesis 1 is supported. However the paths from individual strength use to flourishing, as well as the paths from team and individual strength use to withdrawal behaviour were not statistically significant. Hypothesis 2, 3 and 4 are rejected.

Table 5

Fit Indices and Standardized Path Coefficients of the Structural Models

Measures		Model 1	Model 2	Model 3
Fit Indices	χ^2	680.75**	719.20**	844.01**
	<i>df</i>	451	455	456
	AIC	19267.80	19307.75	19461.70
	BIC	19644.90	19671.01	19821.50
	TLI	0.93	0.92	0.88
	CFI	0.94	0.93	0.89
	RMSEA	0.05	0.05	0.05**
	RMSEA 90% CI	[0.04, 0.05]	[0.04, 0.06]	[0.05, 0.07]
	SRMR	0.06	0.07	0.22
Direct effects on flourishing	Team strength use	0.41 (0.11)**	0.42 (0.11)**	-
	Individual strength use	0.21 (0.13)	0.20 (0.13)	-
Direct effects on team embeddedness	Team strength use	0.30 (0.11)**	-	-
	Individual strength use	0.23 (0.11)**	-	-
	Flourishing	0.35 (0.11)**	0.66 (0.08)**	-
Direct effects on withdrawal behaviour	Team strength use	-0.20 (0.12)	-	0.24 (0.12)**
	Individual strength use	0.12 (0.10)	-	0.10 (0.11)
	Flourishing	-0.16 (0.09)	0.20 (0.11)	0.20 (0.09)**
	Team embeddedness	-0.34 (0.13)**	0.37 (0.12)**	0.33 (0.12)**

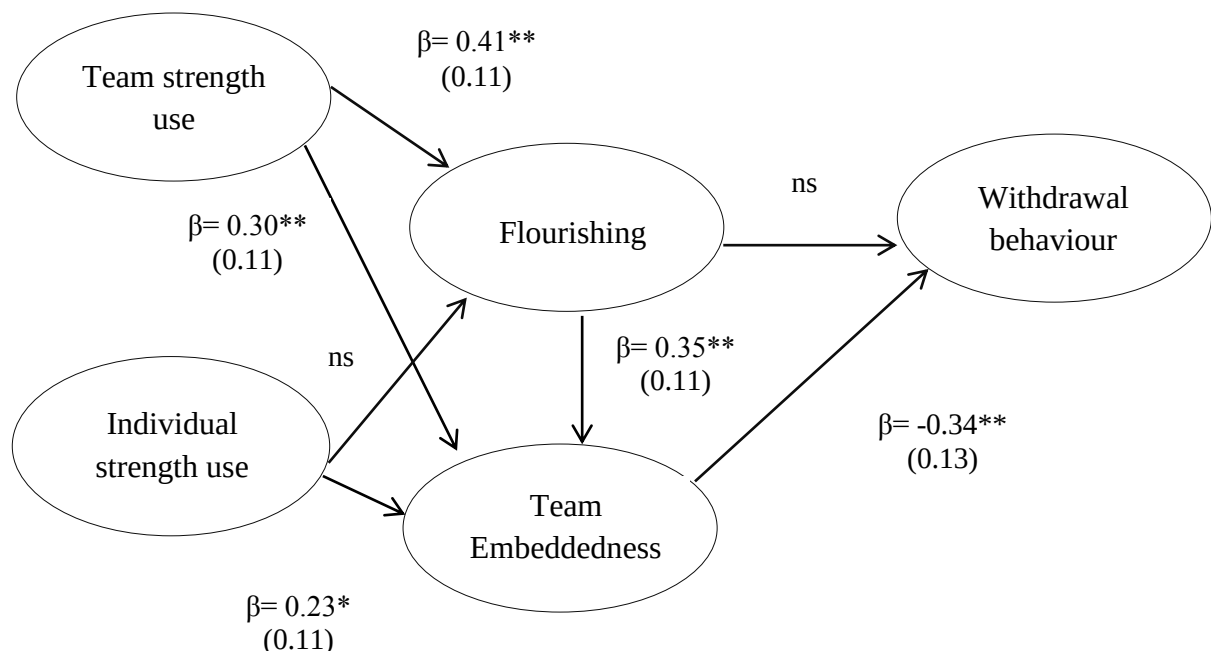
** $p < 0.01$

df= degrees of freedom; TLI= Tucker-Lewis Index; CFI= Comparative Fit Index; RMSEA= Root Mean Square Error of Approximation; SRMR= Standardised Root Mean Square Residual; AIC = Akaike Information Criterion; BIC = Bayes Information Criterion.

Furthermore, statistically significant paths were found from team strength use ($\beta = 0.30$, $SE = 0.11$, $p < 0.01$) and individual strength use ($\beta = 0.23$, $SE = 0.11$, $p < 0.05$) to team embeddedness. Hypotheses 5 and 6 are supported. The path from flourishing to team embeddedness was also statistically significant ($\beta = 0.35$, $SE = 0.11$, $p < 0.01$). Hypothesis 7 is supported.

However flourishing did not predict withdrawal behaviour (Hypothesis 8). Team embeddedness had a statistically significant negative association with withdrawal behaviour ($\beta = -0.34$, $SE = 0.13$, $p < 0.01$). Therefore, hypothesis 9 is supported. The independent

variables explained 32% of the total variance in flourishing, 54% of the variance in team embeddedness, and 29% of total variance in withdrawal behaviour. These findings present further evidence for the validity of the structural model.



* $p < 0.05$ ** $p < 0.01$

Figure 3. The structural model (standardised solution with standard errors in parentheses).

Team Embeddedness as Moderator

Next the interaction effect between flourishing and team embeddedness on intention to leave was computed. Mplus 7.31 with a syntax developed by Stride (2015) was used to compute factor scores for the three variables. However, the effect interaction effect was not statistically significant. Support for hypothesis 10 could thus not be established.

Discussion

This research had three broad goals. Firstly, it sought to ascertain whether the strength-based approach dimensions (team and individual strength use) could predict flourishing of athletes. Secondly, it examined the role these dimensions, as well as flourishing, play in moving such athletes to continue their participation in the activities of their sport and sport team. Finally, it

assessed the role of team embeddedness in the relationship between flourishing and withdrawal behaviour of athletes.

This study sought to supplement the literature with information on the antecedents of flourishing of people (Seligman, 2011) and proved novel in its approach to scrutinise such antecedents in the context of a sport setting. Through this, the research supplemented studies done by Schachaf and Katz (2014), Malebo et al. (2007) and Penedo and Dahn (2005); which examined particular optimal human states in sport contexts, towards understanding the antecedents required for total well-being at a multitude of levels; in terms of emotional, social and psychological well-being – the dimensions of which flourishing is constituted of (Keyes, 2005). In this study, the strength-based approach dimensions were explored in terms of its potential to enhance the levels of flourishing of athletes.

Firstly, team strength use (TSU) was evaluated in terms of its potential in harnessing flourishing, enhancing team embeddedness and countering withdrawal behaviour. TSU refers to the culture, procedure and policies that exist in a sports team that make the utilisation of its individual members' strengths more possible (Stander & Mostert, 2013). Els et al. (in press) argue that TSU is characterised by a willingness to enable strengths of team members through the way in which the team operates and how it functions on a daily basis. TSU has been linked with a number of favourable performance outcomes such as enhanced levels of productivity (Stander et al., 2013) as well as engagement (Botha & Mostert, 2014).

This study established that TSU predicts flourishing, herewith proposing that the TSU developmental approach poses significant personal and well-being-related value. It also established that TSU was positively related to team embeddedness. The findings provide support for the results of Stenseng et al. (2014), who argued that a positive culture which promotes the individual team members' potentialities will enhance the bond between such members. This information is particularly useful to two stakeholders, namely the leadership teams of sport teams as well as the psychological consultants/professionals involved with such teams. The leadership teams of sport teams can learn that a culture of active strength accentuation and promotion can service the individual team members of their teams. TSU offers an enabling environment for individual team members to display their potentialities. It provides a supportive team environment, which cultivates higher levels of enjoyment from

members and ultimately results in peak performance (Elbe, Strahler, Krustup, Wikman, & Stelter, 2010).

From the perspective of psychological consultants working with such teams, interventions geared at creating a culture of strength use in the sport team will lead to higher levels of flourishing and embeddedness in teams among members, which is required for both sustained well-being and optimum performance levels (Grant & Cavanagh, 2007). Such interventions, at team level, can be workshops during which individual member strengths are discussed and explored to the benefit of the entire team. It can also include directed efforts at understanding what the strengths of the team members are towards gauging a better understanding of how synergies between such strengths can be to the benefit of the entire team.

The individual strength use dimension (ISU) also revealed to be positively related to team embeddedness. To this extent, the PROSPER model of Noble and McGrath (2015) served as a valuable theoretical point of departure. The model argues that the proactive inclination of individuals to seek and utilise their personal strengths as described by Els et al. (in press) is an important component of the overall optimal functioning of individuals. Individual interventions, such as coaching or mentoring, through which the athlete is made aware of and encouraged to actively utilise his/her unique character strengths, is thus proposed by the authors as a practical measure that can be applied to enhance athletes' experience of embeddedness in their teams. This can result in enhanced cohesiveness among the team members and lead to better overall performance (Elbe et al., 2010).

The second objective of this research was concerned with whether flourishing is positively related to team embeddedness; and negatively related to withdrawal behaviour, i.e. whether it is possible to argue that flourishing can decrease the participant's intention to leave the sport or sport team. Although the latter relation was not supported in this study, the results suggested that a positive association between flourishing and team embeddedness may exist. Flourishing individuals function positively in a group context, want to contribute meaningfully to society and experience their relations with others as fulfilling (Fink, 2014; Keyes, 2002, 2005, 2007). These individuals should be more likely to experience embeddedness in the sport teams they form are part of.

Although flourishing is a comprehensive well-being state which resonates with the internal state of the sport participant, much can be done to enhance its dimensions in a sport context – from a team and individual perspective. By enhancing the emotional reward associated with sport, such as providing fulfilling training environments and celebrating success (Stenseng et al., 2015); creating social value for team members, such as supportive team environments (Reinboth & Duda, 2006); and promoting psychological well-being through such interventions as enhancing confidence (Biddle & Mutrie, 2008); flourishing of athletes can be enhanced, hereby also promoting the experience of embeddedness of these athletes.

The final research objective was to investigate the relationship of team embeddedness and withdrawal behaviour. We aimed at gauging whether the meaning, purpose and identity sport teams provide to its members (Joessaar et al., 2011; Spaaij & Anderson, 2010) could have any influence on their decision to not withdraw participation from that team. This proved a unique investigation in the sport literature. The research suggested that, should the members of a sport team experience their involvement in that team as a strong fit to their personality, experience links with their team members and perceive retirement from the team as sacrificing, they are likely to not withdraw from that team (Zhang et al., 2012). Although embeddedness was not proven as a moderator between flourishing and withdrawal behaviour, the direct predicting relationship of the variable on withdrawal behaviour provides sufficient validation to coaches, administrators and managers of sport teams to actively promote the embeddedness dimensions of their teams in an effort to retain athletes. Focused team-building interventions can facilitate such dimensions and ultimately lead to sustained participation and involvement in sport from athletes.

Conclusion

This study was not without limitations. The cross-sectional nature of the work makes it difficult to understand whether the patterns observed in the results here will apply when the sport environment changes over time. Future research may benefit from adopting a longitudinal design. Secondly, the research was conducted among student athletes, who, based on the inclusion criteria, can be considered semi-professional. It may be interesting to see whether the results will be the same for professional sport contexts, where financial implications come into play. However, the study provided a useful platform for the

exploration of the antecedents and outcomes of flourishing of people in sport contexts, highlighting the role a strength-based approach can play in creating flourishing athletes and suggesting the value of flourishing in retaining such athletes for their teams and sport.

References

- Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International*, 13(3), 209–223.
- Barker, J. B., Jones, M. V., & Greenlees, I. (2013). Using hypnosis to enhance self-efficacy in sport performers. *Journal of Clinical Sport Psychology*, 7(3), 228–247.
- Biddle, S. J. H., & Mutrie, N. (2008). *Psychology of physical activity: Determinants, well-being and interventions*. New York, NY: Routledge.
- Blau, P. M. (1964). *Exchange and power in social life*. New York, NY: Wiley.
- Botha, C., & Mostert, K. (2014). A structural model of job resources, organisational and individual strengths use and work engagement. *SA Journal of Industrial Psychology*, 40(1), 1–11.
- Bothma, C. F., & Roodt, G. (2013). The validation of the turnover intention scale: original research. *SA Journal of Human Resource Management*, 11(1), 1–12.
- Buckingham, M., & Clifton, D. O. (2001). *Now, discover your strengths*. New York, NY: Free Press.
- Byrne, B. M. (2012). *Structural equation modelling with Mplus: Basic concepts, applications, and programming*. New York, NY: Routledge.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Demerouti, E., & Bakker, A. B. (2011). The job demands-resources model: Challenges for future research. *South African Journal of Industrial Psychology* 37(2), 1–9.
- Diedericks, E., & Rothmann, S. (2013). Flourishing of information technology professionals: the role of work engagement and job satisfaction. *Journal of Psychology in Africa*, 23(2), 225–233.
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *International Journal of Behavioural Nutrition and Physical Activity*, 10, 10–98.
- Elbe, A. M., Strahler, K., Krstrup, P., Wikman, J., & Stelter, R. (2010). Experiencing flow in different types of physical activity intervention programs: Three randomized studies. *Scandinavian Journal of Medicine and Science in Sports*, 20, 111–117.

- Emberland, J. S., & Rundmo, T. (2010). Implications of job insecurity perceptions and job insecurity responses for psychological wellbeing, turnover intentions and reported risk behaviour. *Safety Science*, 48, 452–459.
- Fink, M. A. (2014) Flourishing: Exploring predictors of mental health within the college environment. *Journal of American College Health*, 62(6), 380–388.
- Flores, J., Salguero, A., & Márquez, S. (2008). Goal orientations and perceptions of the motivational climate in physical education classes among Colombian students. *Teaching and Teacher Education*, 24(6), 1441–1449.
- Fredrickson, B. (2002). *Handbook of positive psychology*. New York, NY: Oxford University Press.
- Frese, M., & Fay, D. (2001). Personal initiative: An active performance concept for work in the 21st century. *Research in Organizational Behavior*, 23, 133–187.
- Golby, J., & Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences*, 37, 933–942.
- Gordon, S., & Gucciardi, D. F. (2011). A strength-based approach to coaching mental toughness. *Journal of Sport Psychology in Action*, 2, 143–155.
- Gould, D., Dieffenbach, K., & Moffett, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology*, 14, 172–204.
- Grant, A. M., & Cavanagh, M. J. (2007). Evidence-based coaching: Flourishing or languishing?. *Australian Psychologist*, 42(4), 239–254.
- Hair, J. F., Black, W. C., Babin, B. J., & Andersen, R. E. (2010). *Multivariate data analysis: A global perspective*. Upper Saddle River, NJ: Pearson.
- Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the “COR” understanding the role of resources in Conservation of Resources theory. *Journal of Management*, 40(5), 1334–1364.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualising strengths. *American Psychologist*, 44(3), 513–524.
- Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632–663.

- Hone, L. C., Jarden, A., Schofield, G. M., & Duncan, S. (2014). Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Wellbeing*, 4(1), 62–90.
- Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55.
- IBM Corp. (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, NY: IBM Corp.
- Joesaar, H., Hein, V., & Hagger, M. S. (2011). Peer influence on young athletes' need satisfaction, intrinsic motivation and persistence in sport: A 12-month prospective study. *Psychology of Sport and Exercise*, 12(5), 500–508.
- Kaiser, R. B., & White, R. P. (2009). Debunking an unbalanced approach to development. *Leadership in Action*, 28(5), 9–12.
- Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 43, 207–222.
- Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73, 539–548.
- Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist*, 62, 95–108.
- Keyes, C. L. M. (2009). *Brief description of the mental health continuum short form (MHC-SF)*. Available: <http://www.sociology.emory.edu/ckeyes/>. [On-line, retrieved 14 December 2010].
- Keyes, C. L. M., & Annas, J. (2009). Feeling good and functioning well: Distinctive concepts in ancient philosophy and contemporary science. *Journal of Positive Psychology*, 4, 197–201.
- Keyes, C. L., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health*, 100(12), 2366.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling*. New York, NY: The Guilford Press.

- Lee, T. W., Mitchell, T. R., Sablinski, C. J., Burton, J. P., & Holtom, B. C. (2004). The effects of job embeddedness on organizational citizenship, job performance, volitional absences, and voluntary turnover. *Academy of Management Journal*, 47(5), 711–722.
- Linley, P.A., Joseph, S., Harrington, S., & Wood, A.M. (2006). Positive psychology: Past, present, and (possible) future. *Journal of Positive Psychology*, 1, 3–16.
- Malebo, A., Van Eeden, C., & Wissing, M. P. (2007). Sport participation, psychological well-being, and psychosocial development in a group of young black adults. *South African Journal of Psychology*, 37(1), 188–206.
- Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablinski, C. J., & Erez, M. (2001). Why people stay: Using job embeddedness to predict voluntary turnover. *Academy of Management Journal*, 44(6), 1102–1121.
- Moreno, J. A., Cervelló, E. and González-Cutre, D. (2010). The achievement goal and self-determination theories as predictors of dispositional flow in young athletes. *Anales de Psicología*, 26(2), 390–399.
- Muthén, L. K., & Muthén, B. O. (1998-2014). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Nelson, L. J., & Padilla-Walker, L. M. (2013). Flourishing and floundering in emerging adult college students. *Emerging Adulthood*, 1(1), 67–78.
- Noble, T., & McGrath, H. (2015). PROSPER: A new framework for positive education. *Psychology of Well-Being*, 5(1), 1–17.
- Park, N., Peterson, C., & Ruch, W. (2009). Orientations to happiness and life satisfaction in twenty-seven nations. *The Journal of Positive Psychology*, 4(4), 273–279.
- Park, N., Peterson, C., & Seligman, M. E. (2004). Strengths of character and well-being. *Journal of Social and Clinical Psychology*, 23(5), 603–619.
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18(2), 189–193.
- Peterson, C., Park, N., & Seligman, M. E. (2005). Orientations to happiness and life satisfaction: The full life versus the empty life. *Journal of Happiness Studies*, 6(1), 25–41.
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. New York, NY: Oxford University Press.

- Petosa, R. L., & Holtz, B. (2013). Flow for exercise adherence: Testing an intrinsic model of health behavior. *American Journal of Health Education*, 44(5), 273–277.
- Raykov, T. (2009). Evaluation of scale reliability for unidimensional measures using latent variable modeling. *Measurement and Evaluation in Counseling and Development*, 42, 223–232.
- Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, 7(3), 269–286.
- Roodt, G. (2004). Turnover intentions. *Unpublished document*, University of Johannesburg, Johannesburg, South Africa.
- Rothmann, S. (2013). From happiness to flourishing at work: A southern African perspective. In *Well-Being Research in South Africa* (pp. 123–151). Dordrecht, The Netherlands: Springer.
- Ruch, W., Proyer, R. T., Harzer, C., Park, N., Peterson, C., & Seligman, M. E. (2010). Values in action inventory of strengths (VIA-IS): adaptation and validation of the German version and the development of a peer-rating form. *Journal of Individual Differences*, 31(3), 138–149.
- Ryan, R. M., Frederick, C. M., Lipes, D., Rubio, N., & Sheldon, K. M. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology*, 28, 335–354.
- Salkind, N. J. (2009). *Exploring research* (7th ed.). Englewood Cliffs, NJ: Pearson Prentice.
- Schachaf, M., & Katz, Y. J. (2014). The relationship between high school students' participation in sporting activity and personality variables. *Athens Journal of Sports*, 1(1), 35–43.
- Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. New York, NY: Free Press.
- Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55, 5–14.
- Spaaij, R., & Anderson, A. (2010). Psychosocial influences on children's identification with sports teams A case study of Australian Rules football supporters. *Journal of Sociology*, 46(3), 299–315.

- Stander, F. W., Diedericks, E., Mostert, K., & De Beer, L. T. (2015). Proactive behaviour towards strength use and deficit improvement, hope and efficacy as predictors of life satisfaction amongst first-year university students: original research. *SA Journal of Industrial Psychology*, 41(1), 1-10.
- Stander, F. W., & Mostert, K. (2013). Assessing the organisational and individual strengths use and deficit improvement amongst sport coaches. *SA Journal of Industrial Psychology*, 39(2), 1–13.
- Stander, F. W., Mostert, K., & de Beer, L. T. (2014). Organisational and individual strengths use as predictors of engagement and productivity. *Journal of Psychology in Africa*, 24(5), 403–409.
- Stander, F. W., Rothmann, S., & Botha, E. (2015). The role of teammate relationships, communication and self-efficacy in predicting athlete flow experience. *Journal of Psychology in Africa*, 25(6), 1–30.
- Stenseng, F., Forest, J., & Curran, T. (2015). Positive emotions in recreational sport activities: The role of passion and belongingness. *Journal of Happiness Studies*, 16(5), 1117-1129.
- Stride, C. B. (2015). Mplus code for the mediation, moderation, and moderated mediation model templates from Andrew Hayes' PROCESS analysis examples. <http://www.offbeat.group.shef.ac.uk/FIO/mplusmedmod.htm>
- Taris, T. W., & Schreurs, P. J. (2009). Well-being and organizational performance: An organizational-level test of the happy-productive worker hypothesis. *Work & Stress*, 23(2), 120–136.
- Tett, R. P., & Meyer, J. P. (1993). Job satisfaction, organizational commitment, turnover intention, and turnover: Path analyses based on meta-analytic findings. *Personnel Psychology*, 46(2), 259–293.
- Van Dyk, J., Coetzee, M., & Takawira, N. (2014). Satisfaction with retention factors as predictors of the job embeddedness of medical and information technology services staff. *Southern African Business Review*, 17(1), 57–75.
- Van Woerkom, M., Els, C., Mostert, K., Rothmann, S. Jnr, De Beer, L.T. & Bakker, A.B. (in process). Following a strength-based and deficiency-based approach: The development and psychometric properties of a new scale.
- Van Zyl, L. E., & Rothmann, S. (2012). Flourishing of students in a tertiary education institution in South Africa. *Journal of Psychology in Africa*, 22(4), 593–599.

- Wagstaff, C. R., & Leach, J. (2015). The value of strength-based approaches in SERE and sport psychology. *Military Psychology*, 27(2), 65–84.
- Wang, J., & Wang, X. (2012). *Structural equation modeling: Applications using Mplus*. Chichester, United Kingdom: Wiley.
- Wood, A. M., Linley, P.A., Maltby, J., Kashdan, T. B., & Hurling, R. (2011). Using personal and psychological strengths lead to increase in well-being over time: A longitudinal study and the development of the strengths use questionnaire. *Personality and Individual Differences*, 50, 15–20.
- Younkins, E. W. (2010). Human nature, flourishing, and happiness: Toward a synthesis of Aristotelianism, Austrian economics, positive psychology, and Ayn Rand's Objectivism. *Libertarian Papers*, 2(35), 1–49.
- Zhang, M., Fried, D. D., & Griffeth, R. W. (2012). A review of job embeddedness: Conceptual, measurement issues, and directions for future research. *Human Resource Management Review*, 22(3), 220–231.

CHAPTER 4

MANUSCRIPT 3

EVALUATING ATHLETE FLOW OVER TIME

Evaluating Athlete Flow over Time

Abstract

The objectives of this study were to a) evaluate whether changes occur in athlete flow over time, and b) assess whether flow is associated with specific experiences and interventions over time. Ecological momentary assessment was used to record athlete flow levels over time and to gauge whether experiences in the team environment and interventions are associated with flow. A total of 24 under-21 Currie Cup rugby players participated in the study. Data was gathered over a period of one and a half weeks. Responses of players were recorded by a paper-and-pencil method. Data concerning 13 experiences were gathered (totalling 312 data points overall). Athlete flow of the players revealed to be dynamic over time. Close relationships were established between challenge experienced during athletic activity and flow; as well as between individual- and team strength use and flow.

Keywords: Ecological momentary assessment, athlete flow, challenge, strength-based approach, rugby players.

Quantitative studies of psychological phenomena have traditionally been conducted using either surveys or laboratory experiments (Runyan & Steinke, 2015). Although these approaches have contributed to the literature, both have been criticised heavily for its limitations (Hammaker, 2012). In the case of surveys, it is expected of the participant to make a retrospective, memory-biased and often generalised assessment of experiences that occurred, to a varying extent pertaining to time-lapse, in the past of that participant (Gaudiano, Moitra, Ellenberg, & Arney, 2015; Schwarz, 2007; Shiffman, 2005; Shiffman, Stone, & Hufford, 2008). Surveys often fail to capture effectively the real-time experiences of the research participant as it is reliant on the accurate recollection of and reporting on past events. They do not provide for a true “in-the-moment” reflection of the experiences of the research participant (Marszalek, Morgulec-Adamowicz, Rutkowska, & Kosmol, 2014; Runyan & Steinke, 2015; Thomas, 1974). As far as laboratory experiments are concerned, criticism of scholars has centred on the inability of the method to simulate the real environment in which the psychological processes under investigation occurs (Shiffman et al., 2008; Wilhelm, Perez, & Pawlik, 2011). Questions have been raised pertaining to the “ecological validity” of laboratory experiments, as psychological phenomena – which is environmentally specific and often directly shaped by the physical setting in which the research participant finds him/herself (Hammaker, 2012; Shiffman, 2005).

Behavioural scientists conduct ecological momentary assessment to evaluate psychological experiences in an effort: a) to evaluate such experiences as they occur; b) in a manner that is time-specific; c) to make repeated observations over time, and d) to observe these experiences in the natural environment of the research subjects (Stone & Shiffman, 1994). Ecological momentary assessment (EMA) refers to a quantitative research method that assesses responses of participants at a particular time relevant to the phenomenon under investigation, across a period of time in the actual setting in which these experiences occur (McCarthy, Minami, Yeh, & Bold, 2015; Riis et al., 2005; Shiffman, Stone, & Hufford, 2008). Riis et al. (2005, p. 4) have commented that “the method is designed to minimise the influence of biased recall” in the reporting of psychological processes. Although the EMA method has yielded interesting results across some studies in Psychology, further utilisation of the approach will enhance the robustness and validity of the method for the behavioural sciences (Hammaker, 2012; Runyan & Steinke, 2015).

This is particularly true of the use of EMA among participants in sport settings where the method has not been common in research studies – specifically with regard to psychological processes or phenomena (Schlicht, Ebner-Premier, & Kanning, 2013). According to Marszalek et al. (2014), EMA as an approach offers potential benefits to the body of knowledge regarding research in athletic communities. These authors argue: “Not only does it (EMA) allow data to be collected in real time, but also the clinical and theoretical complexity of physical activity can be examined in a real-world environment, along with its associated problems and dynamic processes” (Marszalek et al., 2014, p. 2). This view is echoed by Smyth and Stone (2003) who stated that sport and physical activity activities are complex and nuanced through in-the-moment experiences of participants, necessitating an approach of time-specific activity measurement; which is allowed for through EMA.

Physical activity experiences are fundamentally influenced by the social, environmental and physical ecologies in which they occur, and to accurately capture and report on those experiences, measurement must be contextually specific (Dunton et al., 2011). As such, EMA offers a useful approach in the realm of sport and physical activity. Surprising then, that sport and physical activity studies have not substantially extended the use of EMA to examine psychological experiences of athletes. According to Nicholls and Ntoumanis (2010), EMA is potentially a valuable method to accurately gauge and report on the antecedents and outcomes of psychological processes experienced by athletes over time. As it concerns real-time evaluation, EMA provides researchers with the ability to monitor psychological experiences in the context of the athlete’s immediate environment, which potentially allows for evaluation of dynamic psychological states (Saw, Main, & Gastin, 2015; Schlicht et al., 2013).

In this study, athlete flow experience is evaluated through EMA, exploring whether changes occur in such experiences relating to some ecological variables. No known studies of athlete flow using EMA have been conducted and as such this work will prove novice in its approach.

Conceptualising Athlete Flow Experience

The concept of athlete flow is derived from the research of Csikszentmihalyi (1990). Flow theory argues that people can enjoy optimal absorption state with a particular activity they find deeply meaningful, pleasurable and rewarding (Jackson & Marsh, 1996; Shernoff, Abdi, Anderson, & Csikszentmihalyi, 2014; Stavrou, Jackson, Zervas, & Karteroliotis, 2007). When in a state of flow, individuals are fully engrossed in a particular activity. They perceive themselves to be competent to meet the demands of the challenges put forward by an activity. Furthermore, they experience an amalgamation of awareness and action and are elevated to a sense of complete control over the activity and its subsequent outcomes (Csikszentmihalyi, 1990; Dietrich, 2004; Peifer et al., 2014). Flow is an optimum individual state, because it represents a rewarding, fulfilling and engaging experience (Csikszentmihalyi & LeFevre, 1989; Inghilleri, Riva, & Riva, 2014; Kimiecik & Harris, 1996; Shernoff et al., 2014; Stavrou et al., 2007).

Seen from a sport perspective, flow has been described by Carter, River, and Sachs (2013) as the ideal functioning state, as it allows athletes to obtain full clarity on the goals of their athletic pursuits and renders the athlete with the perception that he/she has control over such athletic activity. Flow, also referred to as “being in the zone”, is a sought-after psychological state in sport. It has been established that the complete immersion with the sport activity brought about by flow state enhances concentration and is favourable for the achievement of optimum athletic performance (Inghilleri et al., 2014; Moreno, Cervelló, & González-Cutre, 2010; Pates & Maynard, 2000). Although athlete flow is a sought-after performance and optimum experience state, it has not been evaluated contextually and in real time through the method of EMA.

Measuring Athlete Flow Experience over Time

Two theoretical foundations are pertinent in the consideration of the dynamics of athlete flow experience over time. Firstly, flow theory itself postulates the experience of flow as a state (Csikszentmihalyi, 1990). The reference to athlete flow being a *state* presents a critical consideration, namely that flow is a dynamic phenomenon that is prone to change over the course of a particular period (Lindsay, Maynard, & Thomas, 2005; Peifer et al., 2014).

Because of its state-like nature, it is possible to argue that athletes can experience flow during different times of the athletic cycle (Jackson, Kimiecik, Ford, & Marsh, 1998). Furthermore, athletes can experience flow in varying levels of intensity (Kawabata & Mallet, 2011). Reference to flow state must include the notion that it is an inconsistent phenomenon, and as such prone to vary between two measurements in time.

The second theoretical consideration revolves around the postulation that athlete flow is influenced by the ecology of the context in which it is experienced. According to the Conservation of Resources (COR) theory of Hobfoll (1989), individuals will actively seek resources in their immediate environment to assist them in dealing with stressors, achieving goals and experiencing sought-after states (such as flow). Individuals will actively seek to accumulate resources in such environment and will strive to maintain those resources they have already amassed to function at an optimum level (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). When resources are in abundance, flow state can more readily be achieved, whereas when these resources are scarce or difficult to obtain, it becomes less likely for athletes to experience flow (Hobfoll, 1989). In a recent study, Stander, Rothmann, and Botha (2015) established that athlete flow is directly related to the team environment in which the athlete is embedded. Elbe et al. (2010) found healthy teammate relationships to be a predictor of athlete flow among football players. It is evident that the ecology in which the athlete finds him/herself does play a role in the experience of athlete flow.

Both theoretical predispositions delineated above puts forward the need for incorporating EMA methods in the exploration of athlete flow. From the perspective of flow as a dynamic state, EMA will assist us in gauging whether there are changes in the experience of flow states of athletes over time (Saw et al., 2015). Considering that athlete flow occurs in the context of a specific ecology, EMA can also potentially assist in scrutinising whether making available particular resources can aid the athlete flow experience (Schlicht et al., 2013). In this study we addressed both questions by examining the flow experiences of under-21 Currie Cup rugby players through a) evaluating whether changes occurred in athlete flow across an athletic cycle and b) whether differences in flow experience could be observed by conducting specific interventions such as strength-based development of the players.

The Influence of the Ecology on Athlete Flow Experience

In line with the notion that flow is a dynamic experience and that it is susceptible to change over time, this study examined the effect of specific athletic events on athlete flow experience and evaluated whether the introduction of interventions could influence the experience of flow.

Firstly, we evaluated whether the perceived challenge of a particular event during the athletic cycle would influence the experience of athlete flow of the participating players. According to flow theory (Csikszentmihalyi, 1990), flow occurs when there is a balance between the challenge experienced and the perceived competence of the athlete to bridge such challenge. In other words, according to Csikszentmihalyi (1990), flow can only occur when challenge exists. It is more likely for a player to experience flow when he/she perceives the athletic activity as highly challenging and then pursues such challenge with the confidence and conviction that he/ she will be competent enough to overcome it (Jackson & Marsh, 1996). Stavrou et al. (2015) commented that challenge is a key pre-requisite for flow to be experienced, which is the feeling associated with overcoming an athletic obstacle by applying skill and aptitude and which provides the athlete with a deep sense of intrinsic reward and pleasure. The very nature of athlete flow state proposes a challenge and skill balance, which suggests that the equation of flow is not possible without the experience of challenge (Fong, Zaleski, & Kay Leach, 2014). In this study, participants were requested to rate their perceived level of challenge experienced during every athletic event in the athletic cycle. This was then mapped in relation to the levels of flow experienced by these players in an effort to establish whether challenge perceived could influence flow experience over time.

Secondly, the role of specific interventions in the experience of athlete flow was evaluated. In this research, interventions were structured on the strength-based approach, a developmental approach which stems from positive psychology (Buckingham & Clifton, 2001). According to the strength-based approach, it is important to accentuate the strengths, virtues and potentialities of people in an effort to gain the best possible developmental advantage (Linley, Joseph, Harrington, & Wood, 2006). The strength-based approach comprises both a team and an individual dimension. Team strength use (TSU) refers to the question as to whether the culture, policies and procedures existing within the sports team make it possible for the

player to utilise his/her strengths and virtues (Van Woerkom et al., in process). Individual strength use describes the inherent capacity of the individual athlete to proactively capitalise on his/her unique strengths to reach goals, navigate challenges and realise optimal expression of potential (Hobfoll, Johnson, Ennis, & Jackson, 2003).

The strength-based approach offers comprehensive growth potential and is a key prerequisite for optimum development (Kaiser & White, 2009). It has also been utilised fruitfully in sport contexts. For example, Golby and Sheard (2004) successfully conducted strength-based interventions to enhance the hardiness levels of professional rugby league players. Gordon (2012) made use of strength-based coaching to facilitate higher levels of mental toughness amongst a sample of professional Sri Lankan cricket players. No studies were found that explored the effect of a strength-based approach on athlete flow. In this study, we structured interventions at both TSU and ISU level, by introducing the participants to a team strength use workshop and by conducting individual strength-based coaching.

Method

Research Design

For the purpose of this study, a longitudinal design was utilised by applying ecological momentary assessment (EMA). Paper-and-pencil method was used to capture the momentary responses of the participants over the athletic cycle (11 days in total). This was done using a player portfolio which was prepared for the purpose of the research. Every athletic event during the athletic cycle was designated a response card in the player portfolio and players provided their responses to each event on this response card, which was included in the player portfolio.

In response to the research aim, which postulates that flow state of the participating players would vary over time, the standard measurements of flow state over the course of the athletic cycle was conducted by plotting the various data points. This allowed the researcher to gauge the natural dynamics of the flow states of the players over time; but also put us in a position of scrutinising whether key events during the athletic cycle had influenced flow state. These key events included an important match, practice session or individual gymnasium training

session. As for the research question that sought to investigate whether the ecology into which the player is embedded influences flow state, two considerations were relevant. Firstly, the role of challenging athletic activities in relation to flow was explored. Secondly, the effect of strength-based interventions, structured at both a team and individual level, in its relationship to flow was examined.

Participants

The participants were a squad of 24 professional under-21 rugby players contracted to a provincial rugby team participating in the Absa Currie Cup Tournament. They were all full-time rugby players who dedicate a large portion of their time to the sport on a daily basis through various formally organised activities. These activities include physical conditioning, gymnasium work, field training sessions and various organised team activities. The measurement was done mid-competition during the Currie Cup and thus at a time of intense athletic activity for these players. The Currie Cup is widely considered to be the oldest provincial rugby tournament in the world and is regarded as South Africa's premier domestic professional rugby league (SA Rugby Stats, 2015). All participating players were male. The sample comprised 18 (75%) white, four (16.67%) black and two (8.33%) coloured players. The sample was well represented as per the conventional rugby positions, with eight (33.33%) of the players being tight forwards (props, hookers or locks); five (20.83%) loose forwards (either flankers or number eights), six (25%) inside backs (scrum halves, fly halves or centres) and five (20.83%) outside backs (wingers or full backs). As the research was conducted amongst an under-21 team, player ages ranged from 19 to 21 years.

The sample size ($n=24$) can be regarded as large enough for an EMA study, as the EMA method requires an in-depth and timeous evaluation of a small number of participants (Uy, Foo, & Aguinis, 2010). Data was obtained from the 24 participants during 13 athletic events during the athletic cycle, which was spread over the course of one and a half weeks.

Measuring Battery

A *biographical questionnaire* was used to obtain information on the players' race and preferred rugby positions.

Perceived challenge was measured by means of a one-item probe during which players were requested to rate the athletic activity in terms of the intensity of the challenge they experienced during it on a five-point Likert scale of which responses ranged from 1 (*not challenging at all*) to 5 (*extremely challenging*).

Athlete flow questions were developed specifically for this study. Eight items were developed based on the established Short Flow State Scale-2 (FSS-2) developed by Jackson and Eklund (2002). This scale has proven reliable in the South African context with Stander et al. (2015) establishing internal consistency of 0.84 through composite reliability measures. The eight items were scored on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). All the developed flow items were scored positively, with the exception of one item, “I felt bored during the activity”; which was scored negatively based on the negative inclination of the statement. Table 1 below documents the flow items.

Team strength use as well as *individual strength use* was measured through two items per dimension, developed specifically for this study. In terms of a frame of reference, the Strength Use and Deficit Improvement Questionnaire (SUDIQ) by Van Woerkom et al. (in process) were used to develop the items used to measure team – and individual strength use. Stander and Mostert (2013) found the SUDIQ to be reliable in South African sport contexts by establishing internal consistency of 0.96 and 0.93 through Cronbach alpha values for TSU and ISU respectively. The four strength-based approach items (two per dimension) were scored on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Table 1

Items Included in the EMA Response Card

Challenge perceived					
<i>Rate the how challenging this activity is on a scale from 1 to 5, 1 being not challenging at all and 5 being extremely challenging</i>	1	2	3	4	5
Athlete flow					
<i>Rate your experience of the activity (gymnasium session, field training session, game) by stating with how much you agree with the following statements, using the scale provided:</i>	1 = Strongly disagree	2 = Disagree	3 = Unsure	4 = Agree	5 = Strongly agree
I felt in complete control over the activity	1	2	3	4	5
I experienced the activity as very rewarding	1	2	3	4	5
I experienced complete focus during the activity	1	2	3	4	5
I felt totally part of the activity	1	2	3	4	5
I learned from the activity	1	2	3	4	5
I felt confident during the activity	1	2	3	4	5
I experienced a sense of direction during the activity	1	2	3	4	5
I felt bored during the activity	1	2	3	4	5
Team strength use					
<i>Please indicate how you feel today by indicating whether you agree with the following statements</i>	1 = Strongly disagree	2 = Disagree	3 = Unsure	4 = Agree	5 = Strongly agree
My team mates utilized my strengths during the session	1	2	3	4	5
My team knows what my strengths are	1	2	3	4	5
Individual strength use					
<i>Please indicate how you feel today by indicating whether you agree with the following statements</i>	1 = Strongly disagree	2 = Disagree	3 = Unsure	4 = Agree	5 = Strongly agree
I used my personal strengths during the activity	1	2	3	4	5
I know what my personal strengths are	1	2	3	4	5

The items developed for the variables elucidated above were consolidated into a designated response card which was completed by every participant during every athletic activity of the athletic cycle. Table 1 above describes the items for the variables included for every response card.

Events and Interventions during the Athletic Cycle

The athletic cycle during which the research occurred lasted one and a half weeks. This started on a Monday to coincide with the preparations of the team, which played on the

Saturday. The briefing session occurred on the Monday afternoon, with the first measurement taking place during athletic activity one, which was a field training session during the Monday evening. In total, 13 athletic activities were measured. These athletic activities are described in Table 2 in the order they had taken place.

Table 2

Athletic Activities Measured During the Athletic Cycle

Athletic activity number	Athletic activity	Description
1	Field training session	Team field training session with the entire squad
2	Gymnasium training session	Players train together in small positional groups in a gymnasium
3	Field training session	Team field training session with the entire squad
4	Individual strength coaching	Individual coaching with players led by researcher
5	Gymnasium training session	Players train together in small positional groups in a gymnasium
6	Field training session	Team field training session with the entire squad
7	Team-building	Strength-based team-building with entire squad
8	Match	Match versus opposition team
9	Gymnasium training session	Players train together in small positional groups in a gymnasium
10	Field training session	Team field training session with the entire squad
11	Gymnasium training session	Players train together in small positional groups in a gymnasium
12	Field training session	Team field training session with the entire squad.
13	Individual strength coaching	Individual coaching with players led by researcher.

Both interventions were based on the strength-based approach. Two athletic activities included the individual strength-based coaching to address ISU and one athletic activity was geared towards strength-based team-building of the entire team, thus addressing TSU. The two individual strength-based coaching sessions were utilised to explore the players' unique individual character strengths – relating to their sport but also their general lives. A structured approach was followed where the researcher qualitatively explored the unique strengths of the player by requesting the player to identify strengths and posing probing questions pertaining to how such strengths have assisted the player in his rugby career or personal life. The player was also requested to describe a situation in which this character strength had benefitted him. The researcher also explored with the player how these unique strengths benefitted the team.

After the first coaching session, every player was assigned with the task of completing the online “Values in Action” (VIA) instrument (Peterson & Seligman, 2004); in an effort to identify psychometrically his unique strengths. Players had to print out their results and report

back on it during the second individual coaching session; where the conversation was steered towards how these character virtues could be further harnessed by the player to his own benefit and optimum development in the future.

The team-building intervention was also conducted from the perspective of the strength-based approach. The entire squad participated in this intervention. A conference venue at a local resort was booked and the team-building intervention comprised two exercises. During the first exercise the squad was divided into two groups and given a difficult riddle to complete. This had to be done in competition format between the groups and within a time-limit. At the completion of the exercise, the team-building facilitator reflected with the entire squad how their unique strengths assisted them in solving the riddle and explored how the various unique strengths of the team members in the group facilitated synergy and complemented each other. During the second exercise the squad as a whole was led in group conversation where the players had to identify each other's strengths and give each other feedback based on those strengths. Players were encouraged to speak freely and openly and share with each other what particular strengths they appreciated in each other. This also enabled the facilitator to, together with the help of the entire squad, identify the strengths unique to the character of the team as a whole.

Both the strengths-based interventions, as well as all the other athletic activities, were assessed with the means of the EMA response card based on the dimensions of challenge experienced, athlete flow, individual strength use and team strength use. These responses were recorded on the response card by means of paper-and-pencil method during every separate athletic activity of the athletic cycle. The researcher was available during the athletic activities to assist participants who may have had questions. There were 13 athletic activities for measurement per player, totalling 312 data points of measurement.

Research Procedure

Permission to conduct the research was formally obtained from the management team of the rugby union who participated in the study. EMA studies are often time-intensive and require a substantial commitment from participants (Uy et al., 2010). In light of this, the researcher coordinated a formal briefing session with the entire squad of players by closely liaising with

the head coach of the team. During this briefing, the players were informed in detail regarding the nature of the research, what would be expected of them and the commitment expected of them in terms of time investment. As ethically required, all players were thoroughly briefed on the voluntary nature of the research and were assured that they could withdraw from the process at any stage. Further to this, participants were assured that the research results would be kept confidential and that only the lead researcher would have access to their responses, which would be captured anonymously. This proved to be a very important part of the research procedure, as athletes would not have wanted negative responses to be known to coaches who may interpret this as weak performance or indicative of areas of deficit. As such, special effort was made; during the briefing session as well as throughout the research process, to guarantee the players that their responses would be kept confidential. Players were asked to sign a letter of consent which also outlined the research process in detail and contained the details of the lead researcher, who is also a psychologist. Ethical clearance for the research was obtained from the academic institution of the lead researcher (Ethics number: NWU-00108-14-S8).

With regard to the research setting, the research took place during mid-season of the 2015 Absa Currie Cup competition. At the time of the research briefing session referred to above, the participating team had lost three consecutive matches in the competition with close margins and was approaching a match against strong opposition. The research setting could be considered a pressure environment for the players, as they had to win the approaching match in order to stay in contention for the play-off stages (“semi-finals”) of the competition (the team narrowly lost this match as well). Also, one needs to consider that these are under-21 rugby players, as such at the ultimate age group level of the game before entering senior professional rugby. Several of these players were thus competing for senior professional contracts at the time of the research. A final consideration is the fact that an entire squad participated in the research. With places limited for a position in the starting 15, or among the seven reserve players; inter-competition existed between the 24 athletes participating.

Statistical Analysis

The SPSS programme (IBM Corp, 2013) was used to analyse the responses of the participants. Mean, range standard deviation, inter-quartile range and coefficient of variation

of variables were calculated and reported as descriptive statistics to the research. Mean refers to the sum of the item scores divided by the number of items for each variable while standard deviation describes the spread of the responses, i.e. to what extent responses vary from the mean score (Spector, 2000). The inter-quartile range (IQR) is the difference between the lower and upper quartile range (Simon, 2008) and describes variance in item responses over time (Salkind, 2009). As such it is an important measure in EMA method. Coefficient of variation (CV) is the percentage of variance in a variable measured over days. No formal cut-off points for CV values exist in the literature, but because CV is expressed as a percentage it is possible to compare scores and gauge higher and lower scores. Standard deviation (SD) describes deviation in individual responses from the group mean value.

Results

Descriptive Statistics: Total Sample

Table 3 shows that the mean scores, SD, IQR and CV values for the entire squad of players. This is inclusive of all athletic activities as described in Table 2 for the full duration of the athletic cycle, thus the measurement of all data points over the whole squad. In terms of interpreting results, it should be noted that 1 represents a low score and 5 a high score.

Table 3

Descriptive Statistics for the Total Sample

Dimension	Mean	SD	CV (%)	IQR
Challenge experienced	3.52	0.91	26	1.15
Athlete flow	3.34	0.73	22	1.11
Individual strength use	3.73	0.80	21	1.30
Team strength use	3.37	0.81	24	1.07

The participants obtained high scores for all the dimensions, with individual strength use measuring the highest (Mean = 3.73). The second highest score was challenge experienced (Mean = 3.52). Challenge had the highest SD and CV scores, with values of 0.91 and 26% respectively. This indicates that the highest level of variation in responses of the various

participating players was recorded on this dimension over time. Thus, although it can be said that players generally found activities challenging (recording general high scores for this dimension), they did perceive these activities at varying levels of challenge compared to each other.

Flow recorded the lowest mean score (3.34) of the dimensions under investigation. Individual strength use (Mean = 3.73) recorded the lowest CV score (21%), which indicates that, of the variables under investigation, it displayed the least variance over time. This is understandable, as one would argue that individual strength use, which is the inherent capacity of a person to proactively use strengths, should be fairly consistent over a brief period, such as the athletic cycle under investigation.

Table 4 provides an overview of the measurements for the entire squad per data point, in other words per athletic activity.

Table 4

Descriptive Statistics of Experiences over Time

Athletic activity												
Dimension	1				2				3			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.57	1.16	32	2.00	3.36	1.15	34	1.00	3.71	0.83	22	1.00
Athlete flow	3.27	1.02	31	2.11	3.40	0.70	21	1.17	3.29	0.55	17	0.64
Individual strength use	3.89	0.92	24	1.63	3.82	0.77	20	1.50	3.71	0.61	16	0.75
Team strength use	3.43	1.00	29	1.13	3.32	0.80	24	1.00	3.46	0.46	13	1.00
Dimension	4				5				6			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.71	0.73	20	1.00	3.36	0.84	25	1.00	3.43	0.85	25	1.00
Athlete flow	3.72	0.55	15	0.75	3.37	0.86	26	0.89	3.37	0.76	23	1.39
Individual strength use	3.82	0.80	21	1.13	3.64	0.63	17	1.00	3.79	0.80	21	1.50
Team strength use*	-	-	-	-	3.29	0.61	19	1.00	3.57	0.85	24	1.00
Dimension	7				8				9			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	4.14	0.77	19	1.00	3.14	0.77	25	1.00	3.29	0.73	22	1.00
Athlete flow	3.71	0.45	12	0.58	2.96	0.89	30	1.39	3.15	0.63	20	0.92
Individual strength use	3.89	0.74	19	1.50	3.57	0.92	26	1.25	3.64	0.74	20	1.13
Team strength use	3.46	0.87	25	1.13	3.07	0.96	31	1.00	3.04	0.60	20	0.63
Dimension	10				11				12			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experience	2.86	1.17	41	2.00	3.36	1.15	34	1.00	3.71	1.07	29	2.00
Athlete flow	2.72	0.98	36	1.50	3.34	0.70	21	0.97	3.29	0.86	26	1.14
Individual strength use	3.39	1.18	35	1.63	3.64	1.18	32	1.63	3.50	0.85	24	1.13
Team strength use	3.14	1.06	34	2.00	3.18	0.93	29	0.63	3.86	0.89	23	1.13
Dimension	13											
	Mean	SD	CV	IQR								
Challenge experienced	4.07	0.48	12	0								
Athlete flow	3.83	0.50	13	0.94								
Individual strength use	4.21	0.58	14	1.13								
Team strength use*	-	-	-	-								

* Team strength use is not reported for athletic activities 4 and 13 as these were individual coaching sessions

The overall scores pertaining to flow can be considered above average for the majority of the data points. This being said, fluctuation of flow levels was clearly evident in the responses. The highest flow score of the squad was observed during the second individual strengths-based coaching session (data point 13). A mean score of 3.83 for the squad was established on this data point. Participants enjoyed the activity, felt engaged and experienced the activity as intrinsically rewarding. The lowest flow score was observed during data point 10 (a mean score of 2.72 was reported). This data point represented the athletic activity of a field training session with the entire squad on the Monday of the second week of the athletic cycle; immediately post their match played on the Saturday. This is interesting, as this may suggest

that the match, which the team lost by a narrow margin, could have possibly influenced flow experience. The loss resulted in the team not being able to qualify for the play-off stages of the Currie Cup; which may have lessened their motivation and absorption in the field training session.

Figure 1 below reports the various dimensions measured over the athletic cycle of the entire squad, plotted on a graph in order to scrutinise more closely the relationship between these dimensions over time.

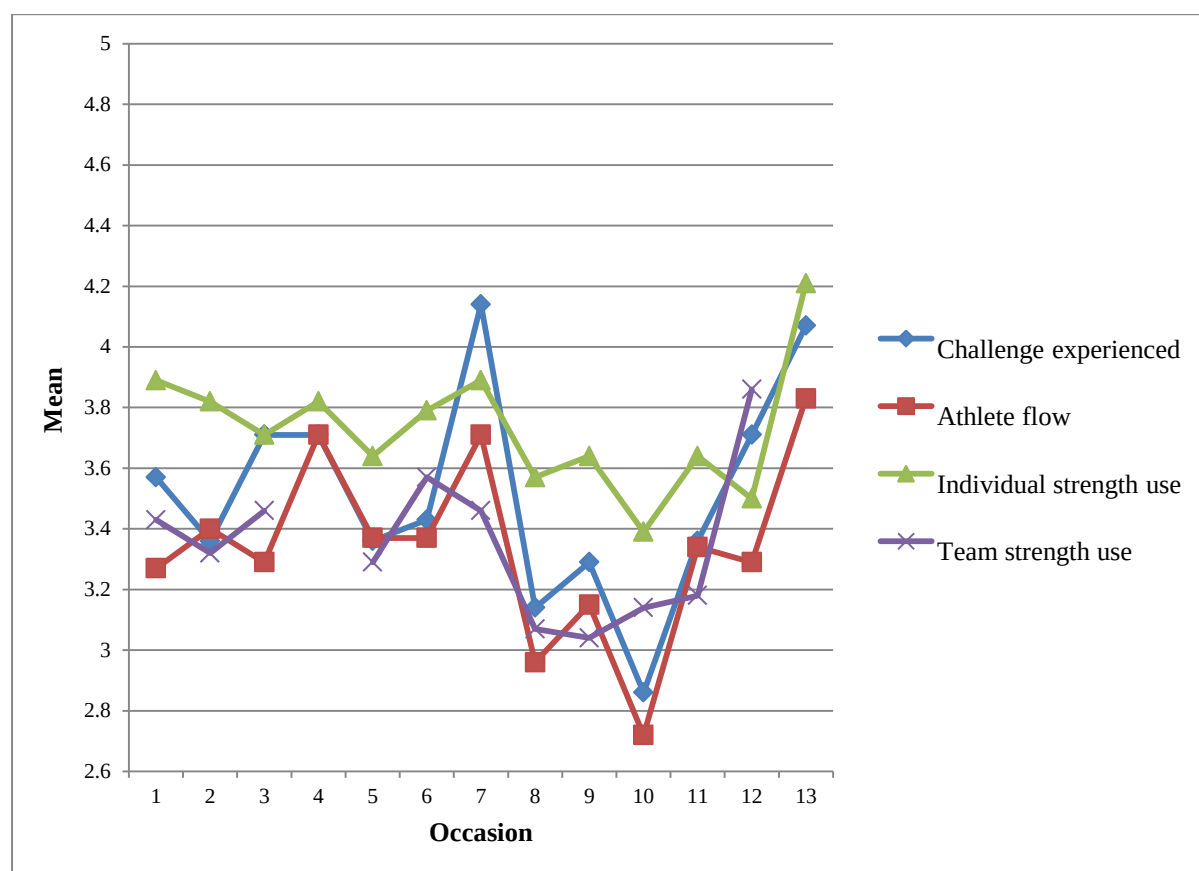


Figure 1. Responses of entire squad over time

In terms of overall patterns, it is evident that variance occurred in flow experiences over time. The highest recorded flow score was during athletic event 13, which was the second individual coaching session (mean = 3.83; CV = 13%). The lowest recorded score for flow was during occasion 10 – the first field training session after the lost match (mean = 2.72; CV = 36%). In terms of challenge experienced, it is also evident that variation occurred over time. The highest recorded score for challenge experienced was activity 7 – the team-building

session (mean = 4.14; CV = 19%) and the lowest recorded score occurred during activity 10, again the occasion of the team field training session on the Monday following the Saturday of their loss (mean = 2.86; CV = 41%).

Of the four dimensions under investigation, individual strength use presented as the most consistent over time. This is evident in the overall CV score of the dimension (21%) as well as the scores recorded during individual occasions. The highest reported score for individual strength use was during activity 13, the second individual coaching session (mean = 4.21; CV = 14%). The lowest recorded score was during athletic occasion 10, which was the first field training session after the suffering of a lost match (mean = 3.39; CV = 35%). Team strength use recorded its highest score during athletic occasion 12, a field training session towards the end of the athletic cycle (mean = 3.86; CV = 23%). The lowest recorded score was observed during activity 9, which was a gymnasium training session, the first time the players saw each other after the lost match (mean = 3.04; CV = 20%).

In terms of the relationships between the variables, it could generally be observed that movement patterns of flow were related to the dimensions under investigation. This applies to challenge experienced, team and individual strength use. The relationship was particularly prominent in the case of individual strength use. The highest observed score for individual strength use (mean = 4.21; CV = 14%), obtained during data point 13; which was the second individual coaching session, coincided with the highest recorded flow score across all the data points (mean = 3.83; CV = 13%). The lowest recorded individual strength use score (mean = 3.39; CV = 35%) also directly coincided with the lowest observed flow score (mean = 2.72; CV = 36%). This was for data point 10 in the athletic cycle; which was the field training session immediately following the loss suffered by the team in the match on the Saturday.

In fact, the correlation between individual strength use and flow experience was of such a nature that, with the exception of data point 2 (a gymnasium training session), all data points displayed congruent movement upwards and downwards as far as these two variables were concerned; i.e. when individual strength use increased from the one data point to the next, the same pattern was subsequently observed with flow experience. Equal to this, when downward

movement from one data point to the next was observed in individual strength use, the same movement could be observed in flow experience.

Figure 2 below reports the movement in athlete flow in isolation of all other dimensions, across the duration of the athletic cycle. It could be observed that athlete flow levels declined in the period immediately after the lost match. This, however, recovered again. Other than this, no conclusive links between specific athletic events and flow experience could be observed.

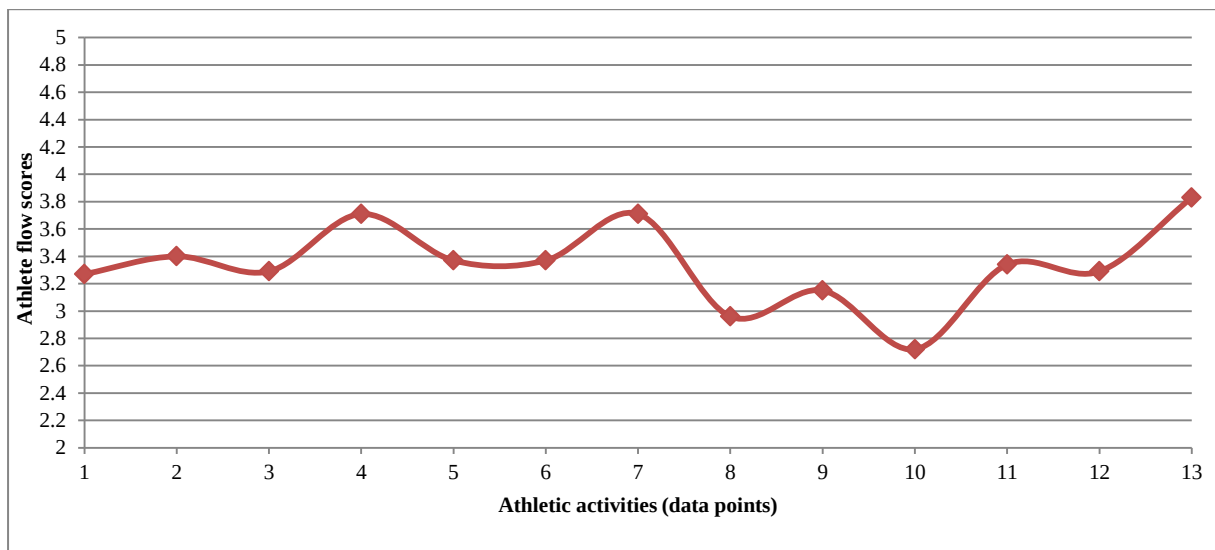


Figure 2. EMA responses for flow over the athletic cycle

Table 5 below captures the mean scores, standard deviations, IQR and CV values per individual player per variable explored in this research expressed as an average across the entire athletic cycle. This is in view of examining the relationships between inter-individual player scores across the entirety of the research cycle.

Table 5

Descriptive Statistics of Individual Players during the study

Player number												
Dimension	1				2				3			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.27	0.91	28	2.00	3.27	1.10	34	2.00	3.88	0.99	26	2.00
Athlete flow	3.41	0.61	18	0.75	3.75	0.85	23	1.75	4.20	0.64	15	1.06
Individual strength use	3.50	0.59	17	1.00	3.95	0.76	19	1.50	4.25	0.60	14	0.50
Team strength use	3.32	0.40	12	0.50	3.41	0.54	16	0.00	3.94	0.42	11	0
Dimension	4				5				6			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.73	1.10	29	1.00	4.20	0.42	10	0	3.70	0.68	18	1.00
Athlete flow	3.70	1.09	29	0.75	4.10	0.26	6	0.34	3.71	0.36	10	1.59
Individual strength use	3.77	1.01	33	0.50	4.05	0.28	7	0.13	3.70	0.48	13	0.63
Team strength use	3.05	0.76	25	0.50	3.80	0.54	14	0.50	3.60	0.46	13	1.00
Dimension	7				8				9			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	4.00	0.67	17	1.00	2.55	1.04	41	1.00	3.18	0.75	24	0
Athlete flow	4.30	0.51	12	0.59	2.59	0.81	31	1.00	3.18	0.74	23	0.63
Individual strength use	3.90	0.21	5	0.13	2.72	0.47	17	0.50	3.05	0.61	20	1.00
Team strength use	3.70	0.35	9	0.50	2.64	0.64	24	1.00	3.00	0.67	22	1.00
Dimension	10				11				12			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experience	3.36	0.67	20	1.00	3.82	1.08	28	2.00	3.55	0.82	23	1.00
Athlete flow	3.85	0.89	23	1.50	4.26	0.86	20	0.88	3.76	0.69	18	0.88
Individual strength use	3.73	0.85	23	1.50	3.64	0.59	16	1.00	3.73	0.90	24	1.50
Team strength use	3.82	0.75	20	1.50	3.68	0.64	17	0.50	3.36	0.95	28	2.00
Dimension	13				14				15			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.36	0.51	15	1.00	3.56	1.01	28	2.00	3.82	0.87	23	1.00
Athlete flow	4.20	0.20	5	0.13	3.70	0.39	11	0.38	3.97	0.68	17	0.13
Individual strength use	4.09	0.20	5	0	3.61	0.33	9	0.50	4.14	0.74	18	0.50
Team strength use	3.64	0.50	14	1.00	3.22	0.36	11	0.50	3.18	0.56	18	0.50
Dimension	16				17				18			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	3.82	0.75	20	1.00	4.00	1.25	31	1.00	4.00	1.00	25	2.00
Athlete flow	4.05	0.42	10	0.75	4.13	1.11	27	0.69	3.83	0.96	25	1.63
Individual strength use	3.73	0.65	17	1.00	3.75	0.75	20	0.50	4.14	1.03	25	2.00
Team strength use	3.36	0.39	12	0.50	3.70	0.79	21	0.63	3.73	0.85	23	1.50
Dimension	19				20				21			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	4.55	0.69	15	1.00	2.18	0.75	34	1.00	3.67	1.23	34	3.00
Athlete flow	3.94	0.74	19	0.88	2.22	0.62	28	1.25	3.90	1.27	33	2.25
Individual strength use	4.41	0.74	18	1.50	2.91	0.20	7	0	4.06	0.68	17	1.00
Team strength use	3.50	0.74	21	1.00	1.86	0.60	32	0.50	3.83	0.94	25	1.25
Dimension	22				23				24			
	Mean	SD	CV	IQR	Mean	SD	CV	IQR	Mean	SD	CV	IQR
Challenge experienced	4.30	0.82	19	1.00	3.75	1.28	34	3.00	3.60	1.17	33	2.00
Athlete flow	4.23	0.21	5	0.31	3.88	1.07	28	1.91	3.55	0.83	23	1.47
Individual strength use	4.40	0.57	13	1.13	3.88	0.69	18	1.25	3.55	0.50	14	0.63
Team strength use	4.30	0.35	8	0.50	3.81	0.70	18	1.25	3.20	0.67	21	0.63

The player who recorded the highest flow score was player 7 (mean = 4.30). Results for flow of this player were also consistently high, with reasonably low variation observed, as recorded by $SD = 0.51$ and $CV = 12\%$. This indicates that player 7 experienced higher levels of flow throughout the athletic cycle. His flow scores were also related to challenge experienced (mean = 4.00; $SD = 0.67$; $CV = 17\%$), individual strength use (mean = 3.90; $SD = 0.21$; $CV = 5\%$) and team strength use (mean = 3.70; $SD = 0.35$; $CV = 9\%$).

Lowest overall flow score was observed with player 20 (mean = 2.22). By evaluating SD (0.62) and CV (28%) scores, it also becomes apparent that these reported scores were fairly consistent. When comparing flow scores of player 20 with challenge experienced (mean = 2.18; $SD = 0.75$; $CV = 34\%$), individual strength use (mean = 2.91; $SD = 0.20$; $CV = 7\%$) and team strength use (mean = 1.86; $SD = 0.60$; $CV = 32\%$), it was also revealed that relationships existed between the variables.

The highest variance in flow score over time as reported through CV values was observed with player 21. This player recorded a mean score of 3.90 for flow, with $CV = 33\%$ and $SD = 1.27$. Upon closer evaluation, it emerges that the player did report high flow scores in general, except for activity 2 (gymnasium training session, mean = 2.00) and activity 8 (the match played, mean = 1.75). In the case of the match played, it is possible that this player experienced an unsatisfactory match, which has been aggravated by the fact that his team had lost. Nevertheless, it is still clear that flow fluctuated significantly over the course of the athletic cycle in the case of this player.

Discussion

The objectives of this study were to a) evaluate whether changes occur in athlete flow across an athletic cycle and b) assess whether flow state would be influenced over time by specific interventions (such as strength-based development interventions). The study aimed to contribute to the literature of EMA studies in the realm of sport settings, where it has been proposed that the method could contribute to understanding complex athlete experiences better due to its ecological relevance and in-the-moment approach (Marszalek et al., 2014; Schlicht et al., 2013). The research aimed to address a gap pertaining to EMA studies of psychological phenomena, of which very limited research exists (Nicholls & Ntoumanis,

2010). It was the first known study to examine athlete flow experience over time through EMA method and as such proved a novice pursuit.

In terms of results, it was established that athlete flow levels do vary over time. The athletes under investigation in this study – professional under-21 Currie Cup rugby players – recorded fluctuating scores over the course of the athletic cycle. Although overall flow levels were considered high for the group as a whole and for the entirety of the athletic cycle, results did reveal clear variation over time, as was seen from both the group- and individual player results. This supports the first theoretical foundation put forward by this research, namely that flow is a state-like phenomenon. When we argue that flow is a state, we suggest that it is dynamic, prone to change and likely to be experienced at different levels of intensity (Csikszentmihalyi, 1990; Dietrich, 2004; Jackson et al., 1998; Kawabata & Mallet, 2011; Peifer et al., 2014). It also suggests that athlete flow across an athletic cycle will be influenced by certain key events (Lindsay et al., 2005). This notion was supported by the results of this research; where it was observed that, after the team under investigation had lost a crucial Currie Cup match, average flow scores for the group as a whole declined during the athletic events immediately post that match. This could also be observed among the individual players, with the majority of the lowest flow scores being recorded after the loss had been suffered.

The second theoretical foundation of this research proposed that athlete flow would be influenced by the ecology of the environment in which it occurs, i.e. the context of the team and athletic environment in which the players are embedded. According to COR theory (Hobfoll, 1989), people seek to accumulate and retain resources in their immediate environment, which assists them to experience optimum states. The theory further maintains that the ecology in which the individual finds him/ herself greatly influences psychological states. In this study, the role of challenging athletic activities in experience of athlete flow was investigated. Results suggested that athlete flow was closely related to the level of challenge players experienced in the execution of tasks during the various athletic activities. This is supported by original flow theory as put forward by Csikszentmihalyi (1990); which argues that flow is a result of a balance between challenge and the perceived skill of the individual. In other words, athletes are more likely to experience flow when they experience an athletic activity as challenging and regard themselves as competent enough to deal with

such challenge (Stavrou et al., 2015). Consistency in the relationship between challenge experienced and flow was also established in this study.

Furthermore, building on the theory of Hobfoll (1989), this study sought to ascertain whether the provision of resources, i.e. interventions, could influence athlete flow over time. Two interventions were introduced, on the basis of the two distinguishing dimensions of the strength-based approach. These were team strength use and individual strength use. Rationale for selecting strength development interventions were found in previous work of such authors as Gordon (2012) who established that the approach could enhance mental toughness of cricketers, and Goldby and Sheard (2004) who successfully utilised strength-based interventions to enhance hardiness levels among rugby league players. Positive relationships were established between both individual and team strength use and athlete flow over time. This was particularly relevant in the case of individual strength use. In fact, the highest recorded flow scores of the group as a whole corresponded directly with the highest recorded score for individual strength use. This also applied to the lowest observed flow score for the entire squad, which was measured congruently to the athletic activity during which the lowest score for individual strength use was recorded.

Practical Implications

The study suggests a number of practical considerations. Firstly, it was confirmed that athlete flow is a dynamic state that can change over time. This is an important consideration for the coaches and management staff of sport teams. It suggests that these individuals must be cognisant of the fact that fluctuation in flow will occur during any athletic cycle. Coaches must sensitise themselves to the realisation that key events during the athletic cycle may influence the flow experience of their players and they must be prepared to adapt their approach accordingly. For example, in the case of this research, it was observed that flow experience declined after the team had suffered a loss. Important questions the coach may have wanted to ask could have revolved around how to put in place interventions so that such a loss is not detrimental to the long-term efforts of the team in pursuit of flow state.

In line with the description of flow as a state, was the notion that the player environment, or ecology, would influence flow experience. In this research results suggested that the

experience of challenging athletic activities over time was positively related to athlete flow. This provides early evidence which suggests that the management of sport teams and individual athletes may facilitate higher levels of flow by providing players with challenging circumstances that test the resolve and skill of the athletes and allow these athletes to utilise their competence to bridge these challenges. Thus, rather than running monotonous and repetitive training routines which athletes will quickly become accustomed to, coaches are encouraged to seek challenging, interesting athletic activities which will test the skill levels of their players and stretch these players to apply their athletic ability in a manner that will provide them with internal gratification. This may be useful to the flow experience over time.

In terms of interventions to achieve athlete flow state, this research suggested the use of individual and team strength use platforms to enhance flow over time. Both levels of interventions of this approach yielded positive results over time, with individual strength use proving particularly useful. Results suggested that, by introducing a culture of strength use in the team and putting in place measures that will assist individual players to more readily utilise and capitalise on their personal virtues, athlete flow could more readily be achieved.

Seen from an individual perspective, these interventions can include individual coaching led by a sport psychology consultant, or exercises which seek to identify individual player strengths and means of assisting players to develop those unique strengths. At team level, it proposes a philosophy of teammates understanding what each other's strengths are in an effort to interact with each other accordingly – to the benefit of the entire group. This will call for a concerted effort on the part of coaches and management teams, as building a strength-based approach at team and individual level takes time. However, when considering the results of this study, it is evident that such effort may lead to sustainable and enhanced levels of athlete flow.

Limitations and Suggestions for Future Research

The study was not without limitations. The EMA research method is contextually specific, which makes the transference of findings to other similar environments difficult (McCarthy et al., 2015; Shiffman et al., 2008). The study was conducted amongst under-21 rugby players. Future studies should examine athlete flow over time among senior professional rugby

players and other sport types. A further limitation was the duration of the athletic cycle, which totalled a week and a half (11 days). It would be interesting to observe athlete flow patterns over a longer period, for example the entire Currie Cup competition. This will also validate the findings of this research, which suggested athlete flow may have been influenced by the losing of a match in the midst of the athletic cycle. By comparing several match results across a longer time period, we will obtain more clarity on the role of specific events on athlete flow over time.

This study also did not account for individual differences among the players relating to athlete flow over the course of the athletic cycle. It is plausible to argue that individual differences pertaining to psychological state of mind, demographics, level of physical conditioning and experiences of individual players will influence athlete flow over a longitudinal period. Future studies should investigate the role of such differences in order to contribute to the literature. This is particularly true of player performance, which was not considered in this study. Finally, as positive relationships were established between challenge experienced and flow state, as well as between the strengths-based dimensions and flow state, future studies should be geared towards understanding, at a practical level, how interventions could be structured to enhance these dimensions. This will prove pragmatic for the consideration of sport coaches and -management teams in their pursuit of enhancing the flow experience of their athletes in their quest to find the sought-after state popularly known as “being in the zone”.

Conclusion

The results of this study revealed that athlete flow experiences changed over time during the athletic cycle, which supports the established theory that describes flow as a state. It further found evidence that the ecology of the environment in which players are embedded should influence their experience of flow state, firstly by establishing that challenging athletic activities positively influence the experience of flow state over time, and secondly by revealing strength-based interventions (at team and individual level) may positively affect athlete flow. This put forward a pragmatic consideration for sport coaches and management teams. It reveals to them that flow is a phenomenon that is bound to vary among their players over time – an aspect they need to account for in their planning and execution of tasks. It

further suggests they can influence the level of athlete flow their players experience by introducing focused and directed interventions in their sporting environments. This should be to the long-term benefit of their athletes' flow experience.

References

- Buckingham, M., & Clifton, D. O. (2001). *Now, discover your strengths*. New York, NY: Free Press.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper & Row.
- Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815–822.
- Dietrich, A. (2004). Neurocognitive mechanisms underlying the experience of flow. *Consciousness and Cognition*, 13, 746–761.
- Dunton, G. F., Liao, Y., Intille, S., Wolch, J., Pentz, M. A. (2011). Physical and social contextual influences on children's leisure-time physical activity: An ecological momentary assessment study. *Journal of Physical Activity and Health*, 8(1), 103–108.
- Elbe, A. M., Strahler, K., Krstrup, P., Wikman, J., & Stelter, R. (2010). Experiencing flow in different types of physical activity intervention programs: Three randomized studies. *Scandinavian Journal of Medicine and Science in Sports*, 20, 111–117.
- Fong, C. J., Zaleski, D. J., & Leach, J. K. (2014). The challenge–skill balance and antecedents of flow: A meta-analytic investigation. *The Journal of Positive Psychology*, 10(5), 425–446.
- Gaudiano, B. A., Moitra, E., Ellenberg, S., & Arney, M. F. (2015). The promises and challenges of ecological momentary assessment in schizophrenia: Development of an initial experimental protocol. *Healthcare*, 3(3), 556–573.
- Golby, J., & Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and Individual Differences*, 37, 933–942.
- Gordon, S. (2012). Strength-based approaches to developing mental toughness: Team and individual. *International Coaching Psychology Review*, 7(2), 210–222.
- Halbesleben, J. R. B., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the COR: Understanding the role of resources in conservation of resources theory. *Journal of Management*, 40, 1334–1364.
- Hammaker, E.L. (2012). Why researchers should think within-person: A paradigmatic rationale. In M. Mehland & T. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 43–61). New York, NY: Guilford.

- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513–524.
- Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632–663.
- IBM Corp. (2013). *IBM SPSS Statistics for Windows, Version 22.0*. Armonk, NY: IBM Corp.
- Inghilleri, P., Riva, G., & Riva, E. (Eds.). (2014). *Enabling positive change: Flow and complexity in daily experience*. Berlin, Germany: De Gruyter Open.
- Jackson, S. A., & Eklund, R. C. (2002). Assessing flow in physical activity: The Flow State Scale-2 and the Dispositional Flow Scale-2. *Journal of Sport & Exercise Psychology*, 24, 133–150.
- Jackson, S. A., Kimiecik, J. C., Ford, S. K., & Marsh, H. W. (1998). Psychological correlates of flow in sport. *Journal of Sport and Exercise Psychology*, 20, 358–378.
- Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The Flow State Scale. *Journal of Sport and Exercise Psychology*, 18, 17–35.
- Kaiser, R. B., & White, R. P. (2009). Debunking an unbalanced approach to development. *Leadership in Action*, 28(5), 9–12.
- Kawabata, M., & Mallett, C. J. (2011). Flow experience in physical activity: Examination of the internal structure of flow from a process-related perspective. *Motivation and Emotion*, 35, 393–402.
- Kimiecik, J., & Harris, A. T. (1996). What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *Journal of Sport and Exercise Psychology*, 18, 247–263.
- Lindsay, P., Maynard, I., & Thomas, O. (2005). Effects of hypnosis on flow states and cycling performance. *The Sport Psychologist*, 19, 164–177.
- Linley, P. A., Joseph, S., Harrington, S., & Wood, A. M. (2006). Positive psychology: Past, present, and (possible) future. *Journal of Positive Psychology*, 1, 3–16.
- Marszalek, J., Morgulec-Adamowicz, N., Rutkowska, I., & Kosmol, A. (2014). Using ecological momentary assessment to evaluate current physical activity. *BioMed Research International*, 1, 1–9.

- McCarthy, D. E., Minami, H., Yeh, V. M., & Bold, K. W. (2015). An experimental investigation of reactivity to ecological momentary assessment frequency among adults trying to quit smoking. *Addiction, 110*, 1549–60.
- Moreno, J. A., Cervelló, E., & González-Cutre, D. (2010). The achievement goal and self-determination theories as predictors of dispositional flow in young athletes. *Anales de Psicología, 26*(2), 390–399.
- Nicholls, A. R., & Ntoumanis, N. (2010). Traditional and new methods of assessing coping in sport. In A. R. Nicholls (Ed.), *Coping in sport: Theory, methods, and related constructs* (pp. 35–51). London, United Kingdom: Nova Science Publishers.
- Pates, J., & Maynard, I. (2000). Effects of hypnosis on flow states and golf performance. *Perceptual and Motor Skills, 91*, 1057–1075.
- Peifer, C., Schulz, A., Schächinger, H., Bauman, N., & Antoni, C. H. (2014). The relation of flow experience and physiological arousal under stress: Can you shape it? *Journal of Experimental Social Psychology, 52*, 1–8.
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. New York, NY: Oxford University Press.
- Riis, J., Loewenstein, G., Baron, J., Jepson, C., Fagerlin, A., & Ubel, A. (2005). Ignorance of hedonic adaptation to hemodialysis: A study using ecological momentary assessment. *Journal of Experimental Psychology, 134*(1), 3–9.
- Runyan, J. D., & Steinke, E. G. (2015). Virtues, ecological momentary assessment/intervention and smartphone technology. *Frontiers in Psychology, 6*, 481–495.
- SA Rugby Stats. (2015). *Currie cup history*. Retrieved from <http://sarugbystats.co.za/currie-cup-history/>
- Salkind, N. J. (2009). *Exploring research* (7th ed.). Englewood Cliffs, NJ: Pearson Prentice.
- Saw, A. E., Main, L. C., & Gastin, P. B. (2015). Monitoring athletes through self-report: Factors influencing implementation. *Journal of Sports Science & Medicine, 14*(1), 137–146.
- Schlicht, W., Ebner-Priemer, U. W., & Kanning, M. (2013). Ecological momentary assessment and intervention in physical activity and well-being: Affective reactions, social-cognitive factors, and behaviors as determinants of physical activity and exercise. *Frontiers in Psychology, 4*, 916–922.

- Shernoff, D. J., Abdi, B., Anderson, B., & Csikszentmihalyi, M. (2014). Flow in schools revisited: Cultivating engaged learners and optimal learning environments. In M. J. Furlong, R. C. Gilman & E. S. Heubner (Eds.), *Handbook of positive psychology in schools* (2nd ed., pp. 131–145). New York, NY: Routledge.
- Shiffman, S. (2005). Dynamic influences on smoking relapse process. *Journal of Personality*, 73, 1715–1748.
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, 4, 1–32.
- Simon, S. (2008). Inter-quartile range. (<http://www.childrens-mercy.org/stats/definitions/iqr.htm>)
- Smyth, J. M., & Stone, A. A. (2003). Ecological momentary assessment research in behavioral medicine. *Journal of Happiness Studies*, 4, 35–52.
- Spector, P. E. (2000). *Industrial and organizational psychology: Research and practice* (2nd ed.). New York, NY: Wiley.
- Stander, F. W., & Mostert, K. (2013). Assessing the organisational and individual strengths use and deficit improvement amongst sport coaches. *South African Journal of Industrial Psychology*, 39(2), 1–13.
- Stander, F. W., Rothmann, S., & Botha, E. (2015). The role of teammate relationships, communication and self-efficacy in predicting athlete flow experience. *Journal of Psychology in Africa*, 25(6), 1–30.
- Stavrou, N. A., Jackson, S. A., Zervas, Y., & Karteroliotis, K. (2007). Flow experience and athletes' performance with reference to the orthogonal model of flow. *The Sport Psychologist*, 21, 438–457.
- Stavrou, N. A., Psychountaki, M., Georgiadis, E., Karteroliotis, K., & Zervas, Y. (2015). Flow theory–goal orientation theory: positive experience is related to athlete's goal orientation. *Frontiers in Psychology*, 6, 1499–1510.
- Stone, A. A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavioral medicine. *Annual Journal of Behavioural Medicine*, 16, 199–202.
- Thomas, I. D. (1974). Survey research: Some problems. *Research in Science Education*, 4(1), 173–179.
- Uy, M.A., Foo, M., & Aguinis, H. (2010). Using experience sampling methodology to advance entrepreneurship theory and research. *Organizational Research Methods*, 13(1), 31–54.

- Van Woerkom, M., Els, C., Mostert, K., Rothmann, S. Jnr, De Beer, L. T. & Bakker, A. B. (in process). Following a strength-based and deficiency-based approach: The development and psychometric properties of a new scale.
- Wilhelm, P., Perrez, M., & Pawlik, K. (2011). Conducting research in daily life: A historical overview. In M. Mehland & T. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 108-123). New York, NY: Guilford.

CHAPTER 5

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

In this chapter an overview of the research findings are provided and conclusions drawn. A revisiting of the research questions raised informs the conclusions and recommendations emerging from the study. Furthermore, the contribution of the thesis to the knowledge base of Industrial Psychology is summarised.

5.1 REVIEWING THE RESEARCH OBJECTIVE

The overall objective of the research was to investigate whether the athletic environment and context will play a role in athlete flow and -flourishing. The research also assessed the state-like properties of these phenomena. The overall objective of the research was divided into specific objectives, which subsequently informed the research questions raised in the three separate manuscripts.

The specific objectives of this research were to:

- Test the validity, reliability and invariance of a structural model by which job resources and personal resources predict athlete flow and -flourishing, within the JD-R model.
- Study whether personal resources will mediate (or moderate) the effect of job resources towards predicting athlete flow and -flourishing, within the JD-R model.
- Investigate whether athlete flow and -flourishing experiences can harness positive sport and personal-related outcomes.
- Examine the state-like properties of athlete flow over time.

5.2 CONCLUSIONS

In Manuscript 1 a structural model of athlete flow was evaluated. Based on the theoretical foundations of the job demands-resources (JD-R) model (Bakker & Demerouti, 2007) as well as conservation of resources (COR) theory (Hobfoll, 1989); this manuscript argued that resources available in the environment as well as within the individual would be constructive

towards the achievement of athlete flow. Bakker, Demerouti, Taris, Schaufeli, and Schreurs (2003) have argued that any role, be it in an occupational or sport team setting, contains certain resources that are favourable to the achievement of desired outcomes. These resources are part of the environment to which the role belongs. People are naturally inclined to attempt an accumulation of these resources by retaining the resources already available to them as well and seeking to accrue additional resources (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014).

In this study, the resources of communication and teammate relationships were investigated as antecedents of athlete flow. Communication in a sport team context refers to the existence of open lines of messages where clarity on the direction of the team is held by all members in a climate of mutual trust (Young, 2012). Teammate relationships refer to healthy relations among the members of the sport team, being able to draw on the support of one's fellow athletes and being able to count on each other during pressing and difficult times (Elbe, Strahler, Krustup, Wikman, & Stelter, 2010). The role of job (sport) resources in the attainment of favourable athlete outcomes have been investigated in a number of studies (Bruner, Munroe-Chandler, & Spink, 2008; Moreno, Cervelló, & González-Cutre's, 2010; Pummel, Harwood, & Lavalley, 2008). The application of the JD-R model and COR theory in the realm of athlete flow was, however, a novice pursuit and the first of its kind in the literature.

Manuscript 1 further explored the role of the personal resource self-efficacy in achieving the athlete flow experience. Hobfoll, Johnson, Ennis, and Jackson (2003) conceptualised personal resources as internal capitals that strengthen people and assist them in achieving goals. It was argued that self-efficacy, which is described as the inherent belief people have that they can overcome challenges (Luszczynska, Scholz, & Schwarzer, 2005), should predict flow amongst athletes. This is because flow suggests a challenge and skill balance, by means of which the individual feels competent enough to meet the challenges raised by a particular situation (Csikszentmihalyi, 1990).

In terms of the research findings, Manuscript 1 revealed both teammate relationships and self-efficacy to be predictors of athlete flow. This suggests that these resources, at a team and individual level respectively, may be favourable to attain the rewarding and optimum state of

flow. This made a contribution at both an academic and practical level. Seen from an empirical point of view, the study was the first to apply the JD-R model and COR theory in an athletic context, and to flow specifically. From a practical point of view, it provided early evidence suggesting contexts and interventions, at group (team) and individual level, could possibly stimulate higher levels of flow experienced amongst athletes.

Manuscript 2 investigated the relationship between athlete flourishing, individual and team strength use, team embeddedness, and withdrawal behaviour. This study postulated that positive relationships would exist between the strength dimensions, flourishing and team embeddedness, and that these dimensions would be negatively related to withdrawal behaviour. Possible indirect effects between flourishing and withdrawal behaviour through team embeddedness were also explored.

Flourishing refers to an optimal mental well-being state and comprises an emotional-, social- and psychological component (Keyes, 2005). The strength-based development approach comprises both group (team) and individual dimensions and refer to the extent to which a team enables its members to utilise their potentialities; as well as the individual inclination of team members to proactively capitalise on their unique virtues (Stander & Mostert, 2013). Team embeddedness describes an individual's perception of fitting in within a particular sport team context, experiencing congruence between one's own values and those of the team and holding the belief that leaving such team will constitute a sacrifice (Lee, Mitchell, Sablinski, Burton, & Holtom, 2004). Withdrawal behaviour is the intention of an athlete to leave his/her sport team (Emberland & Rudmo, 2010).

The results of Manuscript 2 revealed a positive association between team strength use and flourishing. Furthermore, paths from both strength dimensions to team embeddedness were established. Results indicated a positive association between flourishing and team embeddedness. Finally, paths were found between team embeddedness and withdrawal behaviour; whereby results suggested a negative association between these constructs.

Manuscript 2 thus put forward the suggestion to introduce strength-based developmental approaches as a means of creating favourable outcomes in an athletic context such as flourishing and embeddedness. This is in line with the JD-R model and COR theory. It

further highlighted the importance of team embeddedness in a sport environment as a strategy to retain athletes to their team and sport. This notion is supported by the social exchange theory (Blau, 1964); which argues that people will seek the highest possible value from the groups they are formally part of.

Manuscript 3 evaluated possible changes in athlete levels over time by introducing a longitudinal method of ecological momentary assessment to examine the levels of flow experienced by a squad of under-21 Currie Cup rugby players across an athletic cycle. This was done in response to the need for real-time, contextually specific quantitative research in psychological phenomena (Runyan & Steinke, 2015). The aim of the research was to assess whether fluctuation in athlete flow levels would occur and whether such flow experience would be influenced over time by ecological factors, such as key athletic events and the introduction of specific interventions at a team and individual level. The study attempted to contribute to the flow theory (Csikszentmihalyi, 1990), which describes flow as a state-like phenomenon; herewith suggesting that it is dynamic, not consistent and prone to change over time. It was also designed on the notion that, because of its state-like nature, athletes can experience flow in varying levels of intensity (Kawabata & Mallet, 2011).

By using data response cards, included in separate player portfolio's, the researcher gauged athlete flow levels of individual rugby players during an athletic cycle of 11 days, measuring flow levels during activities such as field training, gymnasium training and a competitive match. Results indicated that flow fluctuated during this time. It was further established that flow was influenced by key events – in the case of the research, a drop in athlete flow levels immediately post a lost match.

Further contributing to the idea that the ecology of the team environment will influence flow, the researcher also assessed levels of challenge experienced during athletic activities across the athletic cycle. Results indicated that challenge levels experienced were closely related to flow in such a way that, when the level of challenge experienced was higher, athletes were more inclined to experience athlete flow. This was confirmed at both a team and individual level. It supports strongly the traditional flow theory, which holds that flow can only occur when there is a perceived balance between an individual's competence and the challenge posed by a particular activity (Csikszentmihalyi, 1990).

Finally, for Manuscript 3, two interventions were introduced as a means of evaluating whether flow would be influenced by ecological factors in the sport environment. These interventions were structured on a team and individual level and were both based on a strength-based approach. From a team perspective, a strength-based team-building intervention was conducted with the players. From an individual point of view, strength-based individual coaching sessions were conducted. Clear relationships existed between both dimensions and athlete flow over time, with individual strength use proving particularly closely related to flow experience. This suggested that the introduction of focused interventions in the team environment may influence the experience of athlete flow over time.

5.3 LIMITATIONS

The study was not without limitations. Both Manuscripts 1 and 2 made use of a cross-sectional design, which assesses the responses of participants during only one period in time. This poses the risk of common-method bias and has limitations as far as assessing variables over time are concerned. Both these manuscripts also made use of self-report measures, which are perceptual and have the disadvantage of not being contextually specific and in real time.

Manuscripts 1 and 2 also made use of the same sample – a group of student athletes participating in rugby and football. Although an inclusion criterion was introduced to the study to ensure that all participants had to receive a form of remuneration from their respective universities (in the form of an allowance or bursary) for their participation in sport (herewith ensuring only serious student athletes participated), future studies would still benefit by evaluating a population of senior full-time professional athletes.

In terms of Manuscript 3, a limitation includes the limited transference of knowledge of the findings to other contexts. Ecological momentary assessment is highly contextually specific and takes into account the specific realities of a team. This being said, Manuscript 3 was based on established theoretical models and it is thus reasonable to argue that variation of flow would also occur in other athlete contexts. It is also reasonable to say the interventions introduced could be positively related to flow in other contexts, as support for the relationship between strength use and flow can be found in the literature.

The duration of the athletic cycle for Manuscript 3 posed another limitation. It totalled 11 days, which only included one competitive match during the cycle. Future studies should be designed over a longer period of time to include more matches in an effort to assess whether flow experience is linked to results. Manuscript 3 put forward early evidence which may suggest that this is the case, but studies conducted across lengthier athletic cycles may validate these findings.

5.4 CONTRIBUTIONS OF THE STUDY

The first contribution made by this study relates to conceptualising a model of athlete flow. This study was the first to ascertain whether job (sport) and personal resources as per defined in the JD-R model and COR theory would play a role in the attainment of flow amongst athletes. The study revealed direct paths between teammate relationships (sport resource) and flow, as well as between self-efficacy (personal resource) and flow. This reveals two important considerations and is relevant from both a scientific and practical perspective. From a scientific point of view, it is now plausible to argue that the JD-R model can be used effectively in the realm of athletic contexts and specifically for investigating and predicting models that may enhance the athlete flow experience.

Considering that all measures utilised in the study revealed to be valid and reliable, future studies can now extend on the foundational work of this study by examining a broader range of resources (at both a team and individual level), which may constitute properties that make the attainment of flow more possible for athletes. From a practical perspective, the fact that direct paths were suggested between the variables under investigation reveals that athlete flow – albeit a dynamic and fluctuating state; may certainly be controllable by introducing certain environmental resources and by enhancing individual capacities for development.

From this research we thus learned that flow is not necessarily a phenomenon that indiscriminately and arbitrarily comes and goes – we can introduce measures that may actually assist athletes to more readily achieve flow. Important though – and as suggested by this research – not all resources would necessarily lead to the experience of flow state. The study revealed that whilst teammate relationships were a statistically significant predictor of flow experience, the same could not be applied to communication in the team context. This

may be because teammate relationships represent a deeper fundamental psychological experience of relatedness than communication; thus contributing more to flow, which is a deeply significant and rewarding experience. The insight, however, is not the differentiation between teammate relationships and communication, but fundamentally that environmental resources can influence athlete flow experience and secondarily that certain resources may predict flow and others not. The challenge for future research is to now explore which resources may lead to this deeply rewarding feeling amongst athletes.

The same principle can be applied to personal resources. This study was the first to directly relate inherent capitals to athlete flow experience. By understanding that self-efficacy fulfils a potential role in the experience of flow amongst athletes, early suggestions are made that athletes must be empowered to find within themselves certain psychological capitals that will assist them in achieving this desirable and sought-after state. Whilst self-efficacy, which constitutes an inherent belief that one is capable of accomplishing a certain goal, was revealed to be a facilitator of athlete flow experience, future research must be geared towards unpacking which other personal resources may be significant in athlete flow experience and must investigate how, at an individual level, those resources could be promoted within athletes.

Manuscript 2 provided a contribution in its introduction of various novice applications of established phenomena to a sport context. Most importantly, it was the first to evaluate flourishing specifically amongst a sample of athletes. Rife examples exist in the literature which have examined well-being experiences due to sport participation, athletic activity and involvement in sport in general. However, this study examined the comprehensive model of mental well-being, known as flourishing and comprising emotional, social and psychological well-being, in the realm of an athletic context. One of the findings of Manuscript 2 was that the dimension of team strength use was favourable towards the experience of flourishing of athletes. This finding suggests that an environment which is favourable towards athletes expressing their virtues and talents can potentially be conducive towards realising higher levels of flourishing amongst athletes. This proved to be an important contribution to the flourishing literature. Although various studies exist which have conceptualised the idea of flourishing and has examined its properties to enable favourable outcomes, much work is

needed to understand how to better equip human beings to achieve this comprehensive well-being state. In this regard this study attempted to make a contribution.

This study was the first to introduce the concepts of team embeddedness and withdrawal behaviour to a sport context. These concepts, widely known as job embeddedness and turnover intention, have been thoroughly researched in the occupational literature, but not yet before been explored in the realm of sport. The research revealed an important role of team embeddedness, by establishing a positive association between this concept and flourishing and by suggesting that team embeddedness would counter the intention of athletes of leaving their sport and team. This puts forward an important consideration both for sport team managers and coaches, as it reveals that, by putting interventions, structures and programmes in place which enhance embeddedness, they can positively contribute to their athletes sustaining participation in the sport. Manuscript 2 also empirically suggested that both strength use dimensions (team and individual) may be positively related to team embeddedness. The concept of strength-based developmental approaches has received substantial attention in the literature and is a significantly rising concept in the positive psychology. Its application in sport contexts has, however, been limited. By relating the strength-based dimensions to team embeddedness, this study thus sought to make a significant contribution.

A common theme that emerged from both Manuscripts 1 and 2 was that the psychological phenomena known as flow and flourishing were not haphazard, random experiences, but that means existed which could positively influence such experiences. It suggested that, in the context of an athletic and sport setting, it is possible to assist athletes in achieving these states, as opposed to merely leaving such athletes to their own devices. This common theme was further scrutinised through Manuscript 3, which evaluated athlete flow on a longitudinal basis by introducing ecological momentary assessment.

Manuscript 3 was the first known study to have evaluated flow in a real-time, ecologically specific manner. This was not only for sport contexts, but in general. An important consideration here is the properties of flow. By definition flow is a state-like phenomenon; suggesting it is likely to change over time, can be experienced in different levels of intensity by people, is susceptible to influence by environmental factors and may be altered by the

introduction of targeted interventions. Considering these properties of flow, it was somewhat surprising to find that the concept has not been evaluated by means of ecological momentary assessment and to find such limited material assessing flow over time. The study made a contribution to the flow literature by introducing a real-time, ecologically-specific evaluation of the state across the span of an athletic cycle.

In terms of results, the study revealed flow to be related to a number of environmental realities in the athletic cycle over time. First, it was revealed to be closely related to the experience of challenging athletic activities. Secondly, results suggested flow would be influenced by specific events during the athletic cycle in question. In the case of the research, a lost match resulted in a decline in athlete flow experiences. Finally, the results provided early evidence that interventions could play a key role in achieving athlete flow experience. In this study, interventions were structured on a strength-based approach and comprised both team- and individual intercessions. The outcomes of the research suggested that both these dimensions were closely related to flow over time.

By assessing athlete flow across a time period and in a manner that is ecologically specific, the research made an important contribution to the flow literature. Quantitative evaluations of flow have traditionally made use of self-report measures. Although the psychometric properties of these measures cannot be disputed, where they do fail is in capturing the real-time experiences of people in a manner that is sensitised to the ecology in which such experiences occur. Flow, as an experience, has always taken place in direct relation to a particular event. Thus, it was very important to conduct a study that sought to examine the occurrence of this optimal human state in its natural environment and in a manner that was time specific.

From a practical point of view, this study also provided relevant information for consideration to stakeholders in the sport and athletic community. Flow, often popularly referred to as the “zone” in sport contexts, is a highly sought-after and optimal state that athletes have linked to a number of favourable outcomes. This study proposes that flow varies over time and more importantly that measures can be introduced to enhance the likelihood of the experience amongst athletes. It also proposes that flow should be monitored over time, in order for sport team managers and -coaches to effectively approach the

experience of flow among their athletes, they should be cognisant of its dynamic nature and must understand during which times flow is more likely to occur. By understanding the varying nature of the flow experience, they can capitalise on key events and interventions to actively promote the state among their players.

The study assessed flow over time by making use of data response cards which players had to physically fill in. This proved effective, but from a contribution point of view also laid a foundation on a practical level by suggesting coaches consider monitoring flow over time by using appropriate technology. In the professional sports domain, elaborate technology exists to evaluate athletes' physical attributes and properties, specifically over time. For example, in both football and rugby, global positioning systems (GPS) have been used to track the metres covered and physical effort exerted of players during a competitive match or training session, and across a specific athletic cycle, such as a season of competition. We have not yet seen the introduction of technology to assess the experience of psychological phenomena amongst athletes over time. This study sought to contribute knowledge concerning the importance of considering the introduction of such measurements and technology.

In totality, the contribution of this research was informed by the pursuit of the overall research objective, which was to investigate whether the athletic environment and context will play a role in athlete flow and flourishing. The state-like properties of flow and flourishing were scrutinised and we learned that these favourable, sought-after states could be actively influenced by introducing specific measures in the ecology of the sport environment.

5.5 RECOMMENDATIONS

5.5.1 Recommendations to Solve the Research Problems

At the onset of this research, a gap was identified in relation to identifying whether ecologies/ contexts/environments can play a role in the attainment of athlete flow and flourishing. Both of these states are favourable, optimal well-being conditions. However, it is necessary to scrutinise the factors and contexts that may actually contribute to the achievement of these states. Therefore, the following recommendations are suggested.

Firstly, teammate relationships (a job resource) and self-efficacy (a personal resource) should be addressed to increase athlete flow. Sport coaches and managers are encouraged to look towards healthy teammate relationships as a pertinent resource which can assist athletes to more readily experience flow. Teammate relationships that are healthy provide a climate of trust, openness and relatedness that represent deeply significant human experiences and as such may enhance the accessibility of the flow experience. In this regard, stakeholders in the athletic domain must consider interventions that harness close and meaningful bonds between sport team members. These interventions may include focused teambuilding sessions, team workshops and group coaching geared towards team members understanding and appreciating each other's strengths, unique capabilities and offerings. Because flow is a deeply psychologically meaningful experience, it is also advisable for these interventions to be presented at a fundamental level where trust and loyalty between team members can develop. In this instance, mere transactional attempts at fostering better teammate relationships will not suffice.

The personal resource of self-efficacy may lead to heightened flow experience. Sport coaches and managers, as well as consultants who work with athletes should focus on bolstering levels of self-efficacy in an effort to amplify what is popularly known as the "zone" state of being amongst athletes. Flow is possible when there is a balance between the challenge faced and the perceived skill of the individual. Coaches must therefore stretch their athletes during training to set challenges. Successful navigation of these challenges should contribute self-efficacy and in turn assist the athletes to more readily achieve flow state.

Individual and team strength use predicted flourishing of athletes. Stakeholders in the sport domain who aim to influencing players' flourishing should create team cultures that promote the accentuation of members' unique strengths and capabilities. This can be done through interventions which a) identify unique member strengths, b) share and create awareness about strengths in the team environment, and c) put in place customised, unique policies, game plans and strategies in the team environment designed specifically with members' unique virtues in mind. Strength-based developmental interventions should also contribute to team embeddedness. Team embeddedness describes a very strong cohesiveness between the members of a team, embedded into an ecology which they find favourable. Making resources available, as defined in the theoretical frameworks of the JD-R model and COR theory, in the

environment and within the individual, will contribute to flow and flourishing. Coaches and sport managers should contribute to develop cultures of strength use. However, they should also promote individual strength use. The best possible way to achieve this is by having a sport psychologist work with players and guide them to identify and develop their unique character strengths.

Promoting cohesiveness among team members by establishing team embeddedness should counter withdrawal behaviour among athletes in team contexts. Facilitative team environments could contribute to retaining athletes for sport teams. There are many examples throughout history of successful sport teams who achieved greatness because of their cohesion, loyalty to each other and deeply significant bonds. To retain athletes, the focus must be on creating links and fit between team members. These members must also regard leaving such team as a sacrifice. By creating team cultures that reflect the values of team members, of which team members can be proud of and which provides them with a deep sense of relatedness, this can be achieved.

Secondly, the results of this study revealed that athlete flow is dynamic over the course of a specific cycle, is influenced by certain key events, can be influenced by the challenge levels that athletes experience and could potentially be shaped by introducing directed interventions on a group (team) and individual level. This was a significant insight as it supports the notion that certain contexts will be more favourable to well-being states than others. It also puts forward the critical need for evaluating these states over time, as it was revealed, at least in the case of flow, that they are not static but dynamic. Thus, to more readily achieve flow; coaches and management teams must closely monitor the state to understand which events and interventions are related to this desired and optimum outcome.

As flow was proven to vary over time amongst the participants, stakeholders in the sport and athletic domain are encouraged to actively monitor this state amongst their athletes. Several means exist to explore and record systematically the physical attributes of athletes, whilst no such measures exist in the case of psychological phenomena. This is a chronic shortcoming of particularly sport at a professional level, as a competitive advantage can be achieved in this domain. Coaches and managers in the professional sport domain must prioritise the measurement of flow over time as it is a key optimal state. By enhancing the level of

challenge that athletes experience, these athletes will more likely achieve flow over time. Quite often sport training and preparation becomes monotonous and repetitive activities to which athletes gradually become accustomed to and perceive as boring. This will negatively affect flow. Coaches must introduce challenging, stimulating activities that will require athletes to utilise their full repertoire of skills in an environment that they enjoy and find interesting. Athletes must also be challenged to perform at their optimum level and employ their best available competence sets to achieve outcomes. This will lead to them more likely experiencing flow over time.

5.5.2 Recommendations for Future Studies

In terms of utilising the JD-R model and COR theory as a framework for the exploration of job (sport) and personal resources that can lead to flow and flourishing, this study provided a solid platform to work from. Future studies should investigate a broader range of resources, from a team and individual perspective that may lead to these favourable states. As was evident in the research, some resources do predict flow and flourishing whilst others could not conclusively be proven to do so. It is important to cast a wider net of investigation into resources that constitute the properties required to facilitate optimum experiences. This will benefit the literature but also solidify the conjectural point of departure of the theories alluded to above. Furthermore, this will assist sport coaches, managers and stakeholders in general at a practical level as it should provide them with the knowledge as to which resources they need to bolster in the team environment through targeted intervention.

An important consideration for future studies can also be to include the demands as per the JD-R model in an investigation of athlete flow and flourishing. Whilst the JD-R theory argues that resources assist individuals to reach goals and are favourable towards achieving desired outcomes, it also holds that demands; physical, psychological or social burdens in the environment of the athlete, counters this process and places pressure on the individual. Future studies should investigate the balancing of resources and demands and the subsequent dynamics in the process of facilitating the desirable outcomes of flow and flourishing.

In terms of both Manuscripts 1 and 2, a recommendation for future studies could be to extend the research to full-time, professional and senior athletes. Manuscripts 1 and 2 conducted a

quantitative evaluation of a sample drawn from student athletes. It will be interesting to see whether the findings could be extended to a large sample of professional full-time athletes, where the ecology of the team environment will significantly differ pertaining to such aspects as remuneration, career opportunities and intra-team competition for places.

As far as the ecological momentary assessment of flow is concerned, future studies should adopt a lengthier approach in design. This research was conducted over an athletic cycle of 11 days. Results suggested that a lost match influenced the experience of athlete flow among the sample group of rugby players. It would be interesting to see whether this pattern would emerge across a lengthier time span, for example a full season of competition. Future studies should also investigate the relationship between flow and performance over time by comparing these dimensions. This will greatly assist in understanding a prominent research question, namely whether flow is a prerequisite for best performance. Flow is an optimum state and a highly enjoyable and intrinsically rewarding experience. It has, however, not been conclusively proven that flow predicts peak athletic performance. Ecological momentary assessment and comparison of these dimensions over time will shed more light on this research question.

It is also suggested that demographic variables and individual player differences be considered in future EMA studies of flow. Flow remains a subjective experience, inherently linked to the realities of the individual. Future studies must incorporate these realities in the study of flow experience over time. This should result in a more robust understanding of the dynamic nature of the state and may assist in designing more informed and targeted interventions to facilitate the state amongst athletes.

Finally, it is suggested that more studies be conducted to comprehensively understand flow experience, particularly through the method of EMA. Considering the state-like properties of the phenomenon, EMA offers a useful method to evaluate the experience over time. This research also provided early support for the value of EMA methods in assessing flow experience. However, significantly more work is needed to validate the findings of the research. It is also important to conduct research in different settings, as EMA is very contextually specific.

5.6 FINAL CONCLUSIONS

The objective of this study, which was to investigate whether the athletic environment and context will play a role in athlete flow and flourishing, was achieved. Both athlete flow and flourishing, which are desirable, sought-after and optimum states, may be more readily achieved by creating contexts that comprise resources that assist athletes. Furthermore, not all resources will necessarily contribute to the achievement of these states, but an inquisitive pursuit of the resources that has the properties of activation will benefit athletes. In terms of the ecology of the sport environment, this study argued that measures must be put in place that are favourable towards athlete flow and flourishing. These experiences, it would appear, are not indiscriminate occurrences, but could be influenced by creating constructive and conducive sporting environments. As a whole, the study made a contribution to the stated title, which examined whether a positive psychological framework can be utilised to achieve flow and flourishing amongst athletes. The challenge is now with scholars and practitioners, who must, respectively, further research the blueprint and ultimately architect and design the environments required.

References

- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22, 309–328.
- Bakker, A. B., Demerouti, E., Taris, T., Schaufeli, W. B., & Schreurs, P. (2003). A multi-group analysis of the Job Demands-Resources model in four home care organizations. *International Journal of Stress Management*, 10, 16–38.
- Blau, P. M. (1964). *Exchange and power in social life*. New York, NY: Wiley.
- Bruner, M. W., Munroe-Chandler, K. J., & Spink, K. S. (2008). Entry into elite sport: A preliminary investigation into the transition experiences of rookie athletes. *Journal of Applied Sport Psychology*, 20, 236–252.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper & Row.
- Elbe, A. M., Strahler, K., Krstrup, P., Wikman, J., & Stelter, R. (2010). Experiencing flow in different types of physical activity intervention programs: Three randomized studies. *Scandinavian Journal of Medicine and Science in Sports*, 20, 111–117.
- Emberland, J. S., & Rundmo, T. (2010). Implications of job insecurity perceptions and job insecurity responses for psychological wellbeing, turnover intentions and reported risk behaviour. *Safety Science*, 48, 452–459.
- Halbesleben, J. R. B., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the COR: Understanding the role of resources in conservation of resources theory. *Journal of Management*, 40, 1334–1364.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513–524.
- Hobfoll, S. E., Johnson, R. J., Ennis, N., & Jackson, A. P. (2003). Resource loss, resource gain, and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632–663.
- Kawabata, M., & Mallett, C. J. (2011). Flow experience in physical activity: Examination of the internal structure of flow from a process-related perspective. *Motivation and Emotion*, 35, 393–402.
- Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73, 539–548.

- Lee, T. W., Mitchell, T. R., Sablinski, C. J., Burton, J. P., & Holtom, B. C. (2004). The effects of job embeddedness on organizational citizenship, job performance, volitional absences, and voluntary turnover. *Academy of Management Journal*, 47(5), 711–722.
- Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The General Self-Efficacy Scale: Multicultural validation studies. *The Journal of Psychology*, 139, 439–457.
- Moreno, J. A., Cervelló, E., & González-Cutre, D. (2010). The achievement goal and self-determination theories as predictors of dispositional flow in young athletes. *Anales de Psicología*, 26(2), 390–399.
- Pummel, B., Harwood, C., & Lavalley, D. (2008). Jumping to the next level: A qualitative examination of within-career transition in adolescent event riders. *Psychology of Sport and Exercise*, 9, 427–447.
- Runyan, J. D., & Steinke, E. G. (2015). Virtues, ecological momentary assessment/intervention and smartphone technology. *Frontiers in Psychology*, 6, 481–495.
- Stander, F. W. & Mostert, K. (2013). Assessing the organisational and individual strengths use and deficit improvement amongst sport coaches. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, 39(2), 1–13.
- Young, J. (2012). Keys to effective communication with players. *Australian Tennis Magazine*, 37(2), 68–69.