


# The nature of self-determination and regulatory styles in high-risk sport contexts: a rapid review

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## SUMMARY

High-risk behaviour, for example indulgent eating, risky sexual behaviour, excessive substance use, reckless driving and poor financial decisions, is often perceived to imply a failure in self-regulation (Fletcher, Paker, Paterson & Synott, 2013; Heatherton & Wagner, 2011). However, in sports like skydiving, skiing, white water kayaking and mountaineering, the regulated application of high-risk behaviour such as quick decision making and even impulsivity is often warranted for safety and success. High-risk sport may thus be regarded as a form of adaptive high-risk behaviour. A better understanding of how self-determination and regulatory styles are applied in these sport contexts, may inform the development of new pathways to help individuals change maladaptive high-risk behaviour intentions in contexts where impulsive decisions might have negative long-term implications. Therefore, the aim of this study is to explore and synthesize the scientific literature in order to better understand the nature and dynamics of self-determination and regulatory styles in high-risk sport contexts.

A rapid review design was used in order to systematically construe an evidence base to inform future research and interventions. The seven steps of Palm's (2013) integration of Melnyk and Fineot-Overholt (2005) and the American Dietetic Association's methodology (as re-explained by Handu et al., 2016) were followed to conduct the review. The formal search was conducted through EBSCO Discovery Service (EDS) search portal. Critical appraisal was based on the Quality Appraisal and Review Instrument (QARI) from the Johanna Briggs Institute (JBI) (JBI, 2014).

Sixteen studies were included in the review, with publication dates ranging from 1985 to 2017. The 16 studies included in the rapid review provided dense information from different fields of study and theoretical vantage points. Six main themes were identified from the analysis, namely (i) sensation-seeking; (ii) risk-taking as challenge; (iii) control and autonomy; (iv) self-regulation; (v) social dimension; and (vi) the self. The review suggests

that individuals who engage in high-risk sport activities cannot be seen as a homogenous, sensation seeking group, as previously suggested and commonly understood. Further, sport participants engaged in several behavioural and emotion self-regulation strategies. The expression of high-risk behaviour in an adaptive context does not only lead to need satisfaction, but also to the development of other strengths and abilities which may eventually lead to an increased sense of well-being. It was concluded that high-risk sport may serve as an adaptive pathway to express, rather than inhibit high-risk and impulsive behaviour. From a SDT perspective, an autonomous motivational orientation and concurrent intrinsic regulatory style may develop, leading to a more regulated expression of high-risk behaviour.

Based on the explorative nature of the study more research is needed to explore and determine if the diversity in motives for engagement in high-risk sport also reflects those for engagement in non-adaptive risk-behaviour. Finally, more research is needed to test the practical potential of what was found.

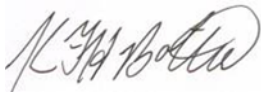
**Keywords:** high-risk sport, self-regulation, self-determination, motivation

## PREFACE

- This mini-dissertation is part of the requirements for the degree Magister Scientiae in Clinical Psychology. It has been prepared in article format and complies with the requirements identified by the North-West University in rule: A.5.4.2.7.
- The document has been edited by an applicable language practitioner.
- Consent for submission was obtained from the research supervisor, Prof. Karel Botha.
- This mini-dissertation was submitted through Turn-it-in, and determined as acceptable in terms of specifications related to plagiarism.
- The document's pages are numbered chronologically starting with *Chapter 1* and ending with *Addendum*.
- It is intended that the article be submitted to The Journal of Positive Psychology (JPP).
- The manuscript follows the stylistic guidelines as determined by the American Psychological Association: 6th edition, except for the article which follows the guidelines as specified by the JPP.
- JPP states that a typical manuscript should be no more than 7500 words. However, the manuscript exceeds this guideline as it is not typical due to the exploratory nature of the review. In addition, for integrity and rigor purposes, it was decided to include a comprehensive data extraction table. For the purpose of submission to the journal, it will be shortened.

## PERMISSION TO SUBMIT

I, the promoter of this study, hereby declare that the article entitled "The nature of self-determination and regulatory styles in high-risk sport contexts; a rapid review," written by M Basson, reflects the research regarding the subject matter. I hereby grant permission that she may submit the article for examination purposes and I confirm that the dissertation submitted, is in fulfilment of the requirements for the degree Master of Science in Clinical Psychology at the North-West University. The article may also be submitted to the Journal of Positive Psychology for publication.



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Prof. Karel Botha

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## **Chapter 1: Literature Review**

### **Introduction**

In this chapter, key constructs and concepts of the study are introduced and discussed in depth. This serves as basis for the brief literature review introduced in the article, which forms part of chapter two.

Firstly, motivation from a self-determination theory (SDT) perspective is discussed briefly. Hereafter, self-regulation is also expanded on – including the interaction between self-regulation and motivation. Next, the concept of high-risk behaviour is introduced, and what it may entail within high-risk sport contexts is considered. This includes the goals and outcomes of high-risk behaviour as a context-dependent concept. Finally, the transferral of high-risk sport principles to other domains of behaviour and the implications hereof are briefly explored in a theoretical sense.

### **Motivation from the Self-Determination Theory (SDT) perspective**

Motivation is one of the most important concepts in psychology and has been described and researched to explain human behaviour from different perspectives. Some earlier key approaches include the Hierarchy of Needs Theory (Maslow, 1943 & 1970), the Two-Factor Theory of Motivation (Herzberg, Mausner, & Snyderman, 1959) and the Expectancy or Valence-Instrumentality Theory (Vroom & Deci, 1970). Although these theories differ, they share the inkling that intentional behaviour is largely determined by needs or wants, which in turn, if appropriate to the context and dependent on certain rewards and expectancies, satisfy those needs.

*Self-Determination Theory (SDT)* is a more recent theory that specifically explains how different types of motivation either help or prevent individuals to behave in effective and healthy ways. SDT was initially developed by Edward Deci and Richard Ryan in the late 1980s (Deci & Ryan, 2000, 2008) and has since been elaborated and refined by a large

network of international researchers (see Vansteenkiste, Niemiec, & Soenens, 2010). SDT can be described as a macro theory of four mini-theories operating from an organismic-dialectical paradigm, meaning that humans will not only inherently strive to grow and better themselves, but also that the environment can enhance or impede this process (Wilson, Mack & Grattan, 2008). Environmental conditions that contribute to the satisfaction of basic innate psychological needs or nutriments, namely autonomy, competence and relatedness, influence not only the strength, but also the type of motivation, being either autonomous or controlled (Deci & Ryan, 2008).

Essentially, SDT states that human motivation lies on a continuum, extending from amotivation (also known as 'non-self-determination') to intrinsic motivation, and between these two polarities extrinsic motivation is found (Brown & Ryan, 2004; Nel, 2014). Non-self-determination (Stavrou, 2008) refers to a total lack of motivation. Amotivated individuals have a lack of control over their contexts and experience incompetence. Towards the middle of the continuum, behaviour is extrinsically motivated. This refers to all types of behaviour motivated by the avoidance of unpleasant events or by the external rewards that they bring, such as admiration, fame or financial benefits. On the opposite side of the continuum lies intrinsic motivation, characterised by behaviour in which people do things because the awards are internal – activities themselves are liked and provide inherent satisfaction, regardless of any external rewards that may exist (Deci & Ryan, 2000, 2008; Nel, 2014; Ryan, Patrick, Deci & Williams, 2008).

According to SDT, the level of motivation also reflects the extent to which a person's innate psychological needs regarding autonomy, competence and relatedness are satisfied. This satisfaction distinguishes between causality or general motivation orientations of individuals within the self-determination framework (Deci & Ryan, 2008). If all three needs are fulfilled, the individual will have an autonomous or intrinsic orientation. If only

relatedness and competence are being satisfied, a controlled or extrinsic orientation will be the result which, in contrast to autonomous regulation, exhausts energy resources. Lastly, if thwarting of all the needs takes place the individual will have an impersonal or amotivational orientation. If needs are continuously thwarted, SDT posits that the individual will then adopt more extrinsically motivated goals, which will lead to external contingencies of worth. Hypothetically, these extrinsically motivated goals, and to a greater extent an impersonal or amotivated orientation, serve as a need substitute, compensating for the lack of need satisfaction (Deci & Ryan, 2008; Stavrou, 2008). Autonomous and controlled motivation both energizes and directs behaviour, but leads to different results, as autonomous motivation leads to more effective performance and long-term persistence (Deci & Ryan, 2008).

### **Self-regulation**

Self-determination is intricately linked to self-regulation. Self-regulation is a widely used concept, pervasively influencing our everyday lives. Consequently, it has been researched from different fields of expertise and theoretical perspectives, resulting in various conceptualisations (Berger, Kofman, Livneh & Henik, 2007). Carver and Scheier (2016) define self-regulation as "self-corrective adjustments needed to stay on track for whatever purpose is being served" (Carver & Scheier, 2016, p. 3); similarly, Zimmerman (2000) defines it as "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (Zimmerman, 2000, p. 14). Hofmann, Schmeichel and Baddeley (2012) define self-regulation as goal-directed behaviour, consisting of 'regulatory processes' and 'content of goals', unified by the satisfaction of basic psychological needs according to SDT (Deci & Ryan, 2000). According to Zimmerman (2000), self-regulation unfolds over three distinct phases, namely goal establishment, goal implementation and adjustment.

Del Castillo, Dias, Pérez and Del Castillo López (2012) add that self-regulation should be a flexible ability and that it acts within different spheres of human functioning (such as behaviour, attention, emotions and cognitions) in relation to internal and external stimuli. For the purpose of this study, self-regulation is described as self-generated thoughts, feelings and behaviours that flexibly and creatively foster change in oneself, in relation to internal and external feedback regarding the success of goal-attainment (cf. Cleary, Callan & Zimmerman, 2012; Del Castillo et al., 2012). It might thus be posited that any action, cognition or emotion serving a goal, or being a goal in itself, relies on self-regulatory processes. Hence, adaptive functioning is heavily dependent on successful self-regulation (Hofmann et al., 2012). Although a number of different self-regulation approaches and models have been postulated, the basic tenet is that once a discrepancy between a goal and current behaviour is noticed, an individual will try to neutralize or decrease the discrepancy in different ways. This could be done, for example, by putting more effort into the task at hand, or by changing or even disengaging from the goal (Carver & Scheier, 2016; Zimmerman, 2000).

### **Interaction of self-regulation and motivation**

Berger et al. (2007) shed some light on the complex nature of self-regulation, noting that it is not only one specific process or system that regulates, but rather "a group of monitoring mechanisms, underlying the ability to self-regulate" (Berger et al., 2007, p. 257). A crucial mechanism of this self-regulation process is motivation (Zimmerman, 2008). Hofmann et al. (2012) indicate that motivation is key to successful self-regulation, specifically in relation to the capacity to reduce discrepancies between goals and current states.

In this regard, self-determination causes different 'regulatory styles' to emerge (Deci & Ryan, 2000, 2008). Firstly, it is no surprise that amotivation leads to *non-regulation*,

because a lack of control and feeling incompetent restrict adaptive efforts in an individual. Secondly, being extrinsically motivated leads to four different regulatory styles, namely *external*, *introjected*, *identified* or *integrated*. Although these regulatory styles may be effective in themselves within specific contexts, they are still extrinsically motivated because they are primarily performed to achieve externally rewarded outcomes. Finally, intrinsic motivation leads to *intrinsic regulation*, in which a person's regulatory style is characterised by adaptive, inherent autonomy (Ryan, Huta & Deci, 2008). Thus, according to SDT, the reason why you do something (how you are motivated to participate in an action based on satisfaction of needs) determines your regulatory style and 'performance' in the activity (Deci & Ryan, 2000). Motivation and self-regulation can thus be perceived as two sides of the same coin, influencing each other reciprocally.

### **High-risk behaviour**

One of the most important contributions of regulatory styles within SDT is that it sheds light on how and why people engage in high-risk behaviour. Other theories that have attempted to explain engagement in high-risk behaviour include normative influences (Celsi, Rose & Leigh, 1993), flow (Csikzentmihalyi, 1990) and edgework theories (Lyng, 1990). High-risk behaviour usually refers to maladaptive contexts, and can be defined as any behaviour where the consequences entail serious possible risks for the individual's health or well-being. Examples include indulgent eating, risky sexual behaviour, excessive substance use, reckless driving and poor financial decisions (Fletcher, Parker, Paterson & Synnott, 2013; Heatherton & Wagner, 2011). According to Turner, McClure and Pirozzo (2004) individuals engaging in high-risk behaviour usually recognise the possibility of detrimental consequences, but fail to effectively take precautionary measures. This implies that discrepancies between current behaviour and future goal states are recognised, but no

intentional action is taken to lessen the gap, possibly indicating poor self-regulatory processes, as discussed earlier.

From a self-regulation perspective, Taylor and Hamilton (1997) propose that incongruities between goals and current behaviour lead to negative emotions. To handle these affective states two strategies can be utilised, one can either disengage from a task or reduce self-awareness (cf. Taylor & Hamilton, 1997). Sensation seeking, characterised by the search for varied, novel and intense experiences, and accompanied by the motivation to take risks for the sake of such experiences (Zuckerman, 2009), is a way to reduce self-awareness. This illustrates how self-regulation and sensation seeking behaviour can be linked. Traditionally, sensation seeking behaviour suggests a lack of self-regulation, as successful self-regulation would entail the opposite – a keen awareness of the self, which inevitably leads to goal-directed behaviour. Thus, unsuccessful self-regulation would most probably be the cause of traditionally viewed volitional high-risk, and sensation seeking behaviour. From a SDT perspective, poor self-regulation in a high-risk context would most probably be determined by poor satisfaction of psychological needs, resulting in a lack of autonomy and an increase in behaviour and choices that are controlled by external rewards.

High-risk behaviour is thus usually viewed in a negative light. As a result, most self-regulation interventions and research concentrate on improving self-regulation, mostly by avoiding high-risk behaviour, or by promoting positive or healthy behaviours. Examples of these preventive efforts include adhering to exercise regimes (Middelkamp, Van Rooijen, Wolfhagen & Steenbergen, 2016), following a weight loss programme (Silfee, Petosa, Laurent, Schaub & Focht, 2016), avoiding sugary drinks and adopting healthier eating habits (Ames et al., 2016), good planning to ensure safe driving (Gwyther & Holland, 2015) and preventing burnout and stress in sport (Dubuc-Charbonneau & Durand-Bush, 2015). These are only a few examples in a plethora of research. Such interventions make sense, as high-



risk decisions may jeopardize one's physical and mental health, but they do not necessarily take into account how a particular socio-environmental context can have important influences on effective self-regulation.

Apart from motivational factors and need-satisfaction, Cleary et al. (2012) reason that utilising the self-regulation skill in an adaptive way is dependent on, apart from motivational factors and need-satisfaction, the context. For example, self-regulating emotions related to aggression might be applicable in a corporate work context while, in contrast, the overt expression of aggression is warranted in a fist-fight or boxing match. Successful self-regulation, like other human behaviour is thus context specific (in terms of applicability) and dependent (in terms of need satisfaction as described by SDT).

Referring to the context-applicability of behaviour (and the modification thereof through interventions based on self-regulation) it could be limiting to assume that the reduction of high-risk behaviour in all contexts is purely adaptive. One can hypothesise that instead of simply developing skills to regulate or inhibit targeted behaviours, cognitions or emotions across all contexts (as most current interventions do), it might be wise to develop a new pathway for expressing these inherent behaviours, in an adaptive context. The high-risk sport context may be ideal for this endeavour.

### **High-risk sport**

Certain contexts depend on an individual's ability to take quick, high-risk decisions to obtain certain goals, to improve performance, or to intrinsically enjoy the activity. As a result, high-risk behaviour research has expanded to include adaptive behaviour such as extreme or high-risk sports (e.g. skydiving, skiing, white water kayaking and mountaineering) and high-risk occupations (e.g. soldiers, paramedics, police, and fire fighters) (Castanier, Le Scanff & Woodman, 2010, 2011; Llewellyn & Sanchez, 2008; Turner et al., 2004). In these instances, precautionary measures are usually taken, pointing to self-regulation as being integral part of

completing these activities in a successful and sustainable manner (Brymer & Schweitzer, 2013).

For the purpose of this study, the focus will be on high-risk sport, defined as sport where the possibility of injury or fatality is an inherent part of participation and where specialised equipment and training are generally required in order to minimise the risks involved (Kupciw & MacGregor, 2012). High-risk sports usually evolve to include greater danger and risk-taking as the athlete becomes increasingly skilled (Barlow et al., 2015), even though the athlete remains cognisant of the danger of death as a consequence if a mistake is made (Brymer & Oades, 2008).

High-risk sport may be regarded as adaptive as it is not just practised with the purpose of sensation seeking or physiological arousal. Research has indicated that this view of sensation-seeking is an overly simplistic and ineffective way to conceptualise the motivation behind these athletes' behaviour (Brymer & Schweitzer, 2013). The sport also plays a role in maintaining positive health effects and subjective well-being (Brymer & Oades, 2008; Ruseski, Humphreys, Hallman, Wicker & Breuer, 2014), developing positive attributes such as humility and courage (Brymer & Oades, 2008), providing the athlete with a vehicle to freedom from social constraints and control (Brymer & Schweitzer, 2013), including affect regulation (Barlow, Woodman & Hardy, 2013; Castanier et al., 2011; Woodman, Hardy, Barlow & Le Scanff, 2010). Regarding affect regulation, Barlow et al. (2013) indicate that some mountaineers might sometimes have difficulties in expressing emotions within their intimate interpersonal relationships. Mountaineering and other high-risk sports are thought to serve as more attainable substitutes to relationships, and provide contexts where competence and autonomy can be experienced when the individual is confronted with fear. Perceived transference of competency and autonomy into other domains of life may also be another effect.

## **High-risk sport from a Self-Determination Theory (SDT) perspective**

SDT elucidates the purpose of high-risk sports from a slightly different perspective. According to SDT, it is posited that extreme sport is not done to intentionally satisfy any specific need according to a pre-determined motive. SDT rather states that activities are pursued because it combines three facets – the activities are interesting to individuals, challenge their skillset optimally, and are usually based on a previous need-satisfaction experience (Deci & Ryan, 2000) Thus, the activity (or extreme sport) in itself is intrinsically motivated and rewarding, and the environment mediates the satisfaction of the basic psychological needs of competence, autonomy and relatedness (Deci & Ryan, 2000). As mentioned earlier, a sense of autonomy (above a sense of competence) is needed for the motivation to be truly intrinsic and autonomous, which leads to greater congruence and integration of the self, behaviour and awareness – in short, it leads to greater psychological well-being. The need for relatedness plays a more distal, but important, role because satisfaction of this need leads to greater flourishing of intrinsic motivation. In the extreme sport context it is crucial, seeing that the sportsperson's safety is often dependent on other persons, for example the belayer holding on to the rock climber's lifeline, and securing his climb from the ground. This inevitable relationship building process might also serve as an integration tool of the individual into the community.

Further, according to Hodgson et al. (2009), mountaineering requires not only impulsivity and tolerance of adrenalin-evoking behaviour, but also effective self-regulation (Hodgson et al., 2009). Therefore, the high-risk sportsperson needs to achieve a balance between regulated behavioural choices, as well as impulsive decisions – sometimes due to a lack of time. Impulsive behaviour is thus not always seen as a weakness in the high-risk sport contexts. The key for sportspeople is to apply impulsive behaviour in a regulated way in order to achieve the maximum benefit from the high-risk activity. In these instances

precautionary measures are extremely important and self-regulation is an integral part of successfully and sustainably completing these activities (Brymer & Schweitzer, 2013). The mountaineer has to effortfully control his every move as well as his emotions for the full duration of the climb, which can sometimes last for days. They need to regulate their behaviour, cognitions and emotions to maintain a perfect balance between extremes such as taking risky decisions at certain times while inhibiting foolish impulsivity at other times. According to Rickly-Boyd (2012), it is only in this thin passage where a regulated balance is maintained where flow and excellence can be attained.

### **Implications of high-risk behaviour principles for other domains**

The inhibition of high-risk behaviour is thus not adaptive in all contexts – instead, it rather seems that high-risk behaviours may hold important and life-saving benefits in some areas. Exploring the nature of self-determination in a high-risk, yet adaptive, sport context may therefore contribute to expanding SDT, specifically regarding the nature of motivation, beliefs and regulatory processes in adaptive high-risk contexts. More specifically, exploring the timely regulatory act of balancing detrimental impulsivity and needed risky decision making may prove beneficial to our understanding of motivation, regulation and risk-taking. Ultimately this may contribute to a better understanding of how self-determination and regulatory styles inform the development of new pathways to help individuals change maladaptive high-risk behaviour intentions in detrimental contexts where impulsive decisions might have negative long-term implications. One such example is to aid clinicians working with individuals in drug rehabilitation or sex offender contexts, where the development of self-regulation skills may be beneficial for these populations.

Research has already indicated that the complex mechanisms of self-regulation start to develop during the first few years of life (Kochanska, Coy & Murray, 2001; Kopp, 1982; Posner & Rothbart, 2000) and continue to develop, especially through exercising the skill

(Muraven, Baumeister & Tice, 1999). Baumeister, Gailliot, DeWall and Oaten (2006) elaborate on how exercising the skill through specific exercises or interventions can generalise improved self-regulation into other domains of the individual's life. The development of this skill helps to improve learning (Brydges & Butler, 2012; Drake, Belsky & Fearon, 2014), interpersonal relationships (Heatherton & Wagner, 2011; Padilla-Walker, Harper & Jensen, 2010), healthy eating behaviours (Johnson, Pratt & Wardle, 2012; Stadler, Oettingen & Gollwitzer, 2010) and other health-related behaviours (Clark, Gong & Kaciroti, 2014; Mann, De Ridder & Fujita, 2013), to name only a few examples. Improvement in self-regulation thus leads to healthy and adaptive behaviour. However, even though research results on motivation and self-regulation within adaptive high-risk contexts exist, none have been found to systematically synthesize these research results. A rapid review, explorative in nature, may help to develop a systematically synthesised evidence base to address this gap in the literature, namely, what is known in the scientific literature about the nature and dynamics of self-determination, regulatory styles and flow in high-risk sport contexts?

## **Conclusion**

Self-regulation is an important skill that underscores adaptive functioning. Traditionally, high-risk behaviour related to health and psychological well-being is viewed as lacking in effective self-regulation. The high-risk sport context provides a different perspective as impulsive behaviours appear to serve a healthier, more adaptive purpose. What does the arguably adaptive high-risk context then tell us about self-regulation in terms of intentional high-risk behaviour? Insight into this question can be found through use of the SDT perspective of motivation and regulation. Literature regarding high-risk sport, risk contexts, and need satisfaction arenas are, however, disperse and diverse in nature. Obtaining an integrated and systematically synthesized research base on these concepts may help to inform self-regulation and SDT, as well as future guidelines and the development of self-

regulation and self-determination enhancement interventions. This may especially be of importance seeing that most current interventions centre on either the enhancement of positive behaviour or the inhibition of risky behaviour. Almost no studies have considered a third possible route, namely one where an applicable context like high-risk sport is used for the adaptive expression of inherent high-risk behaviours.

This literature review thus attempted to describe key concepts such as motivation, self-regulation, self-determination, and high-risk sport, as well as the links between these concepts. Motivation from an SDT perspective was discussed, followed by a brief overview of regulation and the interaction between these two constructs. High-risk behaviour, followed by high-risk sport, was consequently elaborated, with the focus on the high-risk sport context as an arguably adaptive one. Finally, the theoretical implications of adaptive high-risk sport behaviour was briefly explored.

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## **Chapter 2: Manuscript to be submitted for publication**

### **Journal Specifications – Author Guidelines**

#### **About the Journal**

The study, once examined, will be submitted to The Journal of Positive Psychology (JPP) for publication as the contribution of this study is perceived to fall mainly within this domain of psychology, which is the facilitation of self-determination as a human strength in various contexts. JPP is an international, peer-reviewed journal publishing high-quality original research with an impact factor of 2.327 and a 5-year impact factor of 2.577. Its main aim is to be an interdisciplinary and international forum for the science and application of positive psychology. Topics appropriate to this aim include research on, and the professional application and promotion of, optimal human functioning and well-being. Original peer-reviewed research reports, briefer empirical reports, theoretical articles, and review articles with novel and innovative contributions are accepted formats for publication by JPP.

#### **Style and Format Guidelines**

##### **Structure**

Manuscripts should be compiled in the following order: title page; abstract; keywords; main text; acknowledgements; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figure caption(s) (as a list).

All authors of a manuscript should include their full names, affiliations, postal addresses, telephone numbers and email addresses on the cover page of the manuscript. One author should be identified as the corresponding author. Please give the affiliation where the research was conducted. If any of the named co-authors moves affiliation during the peer review process, the new affiliation can be given as a footnote. Please note that no changes to affiliation can be made after the manuscript is accepted. Please note that the email address of the corresponding author will normally be displayed in the article PDF and the online article.

Where available, please also include ORCID identifiers and social media handles (Facebook, Twitter or LinkedIn).

### **Word Limits**

Please include a word count for your paper. A typical manuscript for this journal should be no more than 7500 words; this limit includes tables, references, figure captions, endnotes.

### **Style Guidelines**

Font: Times New Roman, 12 point, double-line spaced. Use margins of at least 2.5 cm (or 1 inch).

Title: Use bold for your article title, with an initial capital letter for any proper nouns.

Abstract: Indicate the abstract paragraph with a heading or by reducing the font size.

A non-structured abstract of no more than 150 words is required.

Keywords: Please provide 4-10 keywords to help readers find your article.

Headings: Running heads and received dates are not required when submitting a manuscript for review; they will be added during the production process. Section headings should be concise. Please indicate the level of the section headings in your article:

1. First-level headings (e.g. Introduction, Conclusion) should be in bold, with an initial capital letter for any proper nouns.
2. Second-level headings should be in bold italics, with an initial capital letter for any proper nouns.
3. Third-level headings should be in italics, with an initial capital letter for any proper nouns.
4. Fourth-level headings should be in bold italics, at the beginning of a paragraph. The text follows immediately after a full stop (full point) or other punctuation mark.

5. Fifth-level headings should be in italics, at the beginning of a paragraph. The text follows immediately after a full stop (full point) or other punctuation mark.

Tables and figures: Indicate in the text where the tables and figures should appear, for example by inserting [Table 1 near here]. The actual tables should be supplied either at the end of the text or in a separate file. Tables should present new information rather than duplicating what is in the text. Readers should be able to interpret the table without reference to the text. The actual figures should be supplied as separate files. Figures should be high quality (1200 dpi for line art, 600 dpi for grayscale and 300 dpi for colour, at the correct size). Figures should be saved as TIFF, PostScript or EPS files. Please use SI units (non-italicized) and ensure you have permission to use any tables or figures you are reproducing from another source.

Spelling and punctuation: Please ensure whichever spelling and punctuation style you use is applied consistently. Please use single quotation marks, except where 'a quotation is "within" a quotation'. Please note that long quotations should be indented without quotation marks. Long quotations of 40 words or more should be indented without quotation marks.

References: American Psychological Association (APA) reference style is to be used.



## Article

### **The nature of self-determination and regulatory styles in high-risk sport contexts: a rapid review**

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## Abstract

Self-regulation is an important skill that underscores adaptive functioning. Traditionally, high-risk behaviour is viewed as lacking in effective self-regulation. Within the high-risk sport context, however, risk behaviour can serve a healthier, more adaptive purpose. The aim of this study is therefore to increase understanding of the nature and dynamics of self-determination and regulatory styles in high-risk sport contexts. A rapid review identified six themes namely *sensation-seeking*, *risk-taking as a challenge*, *control and autonomy*, *self-regulation*, *social dimension*, and *the self*. Using Self-Determination Theory (SDT) it was concluded that, theoretically, the high-risk sport context may be a useful avenue to express inherent high-risk behaviour, which could lead to need satisfaction, intrinsic motivation, increased regulation and, ultimately, an increase in well-being. Recommendations are made to apply the practical potential of the findings within non-adaptive risk-behaviour contexts.

**Keywords:** high-risk sport, self-regulation, self-determination, motivation, amotivation

## **Introduction**

Traditionally, high-risk behaviour related to health and psychological well-being is viewed as lacking in effective self-regulation. The high-risk sport context provides a different perspective as here risk behaviour possibly serves a healthier, more adaptive purpose. The focus of this study is a review and synthesis of the nature of self-determination and self-regulation in high-risk sport contexts.

The concept of motivation has been described and researched to explain human behaviour from different perspectives. In addition to earlier motivational approaches, such as the Hierarchy of Needs Theory (Maslow, 1943, 1970), the Two-Factor Theory of Motivation (Herzberg, Mausner, & Snyderman, 1959) and the Expectancy or Valence-Instrumentality Theory (Vroom & Deci, 1970), Self-Determination Theory (SDT; Deci & Ryan, 2000, 2008), has recently emerged as a credible and well-researched approach to motivation. According to SDT, human motivation can be lacking, or either be extrinsic or intrinsic (Brown & Ryan, 2004; Nel, 2014). A lack of motivation, or ‘amotivation’ (Stavrou, 2008), is characterised by a perceived lack of control over the context and leads to the experience of incompetence. Behaviour is extrinsically motivated when directed by the avoidance of unpleasant events or external rewards such as admiration, fame or financial benefits. Finally, intrinsic motivation is characterised by behaviour where things are done because the activities themselves are liked and provide inherent satisfaction, regardless of any external rewards that may exist (Deci & Ryan, 2000, 2008; Nel, 2014; Ryan, Patrick, Deci & Williams, 2008).

According to SDT, the level of motivation also reflects the extent to which a person’s innate psychological needs for autonomy, competence and relatedness are satisfied by the context. This satisfaction distinguishes among causality or general motivation orientations of individuals within the self-determination framework (Deci & Ryan, 2008). If all three needs are fulfilled, the individual will have an autonomous or intrinsic orientation. If only

relatedness and competence are being satisfied, a controlled or extrinsic orientation will be the result. Lastly, if need satisfaction is not obtained, the individual will probably develop an amotivational orientation (Deci & Ryan, 2008; Stavrou, 2008). These different levels of motivation are intricately and reciprocally linked to self-regulation.

Self-regulation is defined as "self-corrective adjustments needed to stay on track for whatever purpose is being served" (Carver & Scheier, 2016, p. 3), and more specifically, according to Zimmerman (2000, p.14) as "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (Zimmerman, 2000, p. 14). Self-regulation is perceived as a flexible and even creative ability (cf. Cleary, Callan & Zimmerman, 2012; Del Castillo, Dias, Pérez & Del Castillo López, 2012; Hofmann, Schmeichel & Baddeley, 2012) that fosters adaptive change in oneself (Hofmann et al., 2012).

Motivation is a crucial mechanism in the self-regulatory ability to reduce discrepancies between goals and current states (Hofmann et al., 2012; Zimmerman, 2008). More specifically, from an SDT perspective, Deci and Ryan (2000, 2008) and Ryan, Huta and Deci (2008) refer to three different regulatory styles, each related to the three different levels of motivation. These are (i) *non-regulation*, in response to being amotivated, because a lack of control and feelings of incompetence restrict adaptive efforts; (ii) *extrinsic regulation* (with four subtypes), primarily performed to achieve externally rewarded outcomes; and finally, (iii) *intrinsic regulation*, characterised by adaptive, inherent autonomous regulatory efforts. Thus, according to SDT, the reason why you do something, or how you are motivated to participate in an action based on the satisfaction of needs, determines your regulatory style and 'performance' in the activity (Deci & Ryan, 2000.).

Traditionally, high-risk behaviour, for example indulgent eating, risky sexual behaviour, excessive substance use, reckless driving and poor financial decisions, has been

perceived as failures in implementing effective self-regulation (Fletcher, Paker, Paterson & Synott, 2013; Heatherton & Wagner, 2011). The successful completion of activities in certain high-risk contexts, however, depends on an individual's ability to take quick, effective decisions. This seems to be especially relevant to high-risk sports, such as skydiving, skiing, white water kayaking and mountaineering (Castanier, Le Scanff & Woodman, 2010b; Castanier, Le Scanff & Woodman, 2011; Llewellyn & Sanchez, 2008; Turner, McClure & Pirozzo, 2004). In these sports, where the risk of injury or fatality is high, and where specialised equipment and training are generally required in order to minimise risk (Kupciw & MacGregor, 2012), self-regulation is an essential part of successful and sustainable participation (Brymer & Schweitzer, 2013). However, in contrast to other contexts, the regulated application of impulsivity is often *warranted* for the maximum utilisation of the high-risk activity, yet it needs to be delicately balanced with inhibition, for flow and excellence to be attained (Rickly-Boyd, 2012).

High-risk sport may thus be regarded as a form of adaptive high-risk behaviour and is not merely practised with the purpose of sensation seeking or for physiological arousal. According to Brymer and Schweitzer (2013) this is an overly simplistic and ineffective way to conceptualise the motivation behind these athletes' behaviour. Instead, high-risk sport seems to play a role in maintaining positive health effects and subjective well-being (Brymer & Oades, 2008; Ruseski, Humphreys, Hallman, Wicker & Breuer, 2014), developing positive attributes such as humility and courage (Brymer & Oades, 2008), providing the athlete with a vehicle to freedom from social constraints and 'control' (Brymer & Schweitzer, 2013), and affect regulation (Barlow, Woodman & Hardy, 2013; Castanier et al., 2011; Woodman, Hardy, Barlow & Le Scanff, 2010).

From a SDT-perspective, high-risk sport could be pursued because it is interesting to an individual, challenges his or her skillset optimally, and could be based on a previous need-

satisfaction experience (Deci & Ryan, 2000). High-risk sport can therefore in itself be intrinsically motivated and rewarding, within an environment that mediates the satisfaction of the basic psychological needs of competence, autonomy and relatedness (Deci & Ryan, 2000). This could by implication, lead to greater congruence and integration of the self, your behaviour and awareness, and ultimately contributing to a greater personal psychological well-being.

Currently, most interventions based on self-regulation are focused on avoiding high-risk behaviour as it may jeopardize one's physical and mental health. Given the adaptive potential of regulated high-risk behaviour in certain contexts, it could, however, be limiting to assume that the reduction of high-risk behaviour should always be the aim. This study is therefore interested in the possibility of developing new pathways for the expression of adaptive high-risk behaviours. Exploring the nature of self-determination and regulatory styles in a high-risk sport context may therefore contribute to expanding SDT theory, specifically regarding the nature of motivation, beliefs and regulatory processes in adaptive high-risk contexts. More specifically, exploring the timely regulatory act of balancing detrimental impulsivity and needed risky decision making may prove beneficial to our understanding of motivation, regulation and risk-taking. Ultimately, this may contribute to a better understanding of how self-determination and regulatory styles inform the development of new pathways to help individuals change maladaptive high-risk behaviour intentions in contexts where impulsive decisions might have negative long-term implications. One such example may be to aid clinicians working with individuals in drug rehabilitation or sex offender contexts. Furthermore, it may provide guidelines for improving self-determination, and self-regulation, as a strength in a general sense for individuals, groups and organisations, especially for those working within contexts where high-risk decisions are a reality.

Even though research on motivation, self-determination and self-regulation within adaptive high-risk contexts exist, no studies have been found that systematically synthesize these research results. The aim of this study is to explore and synthesize the scientific literature in order to better understand the nature and dynamics of self-determination and regulatory styles in high-risk sport contexts.

## **Methods**

### ***Research design and method***

This study aimed to be explorative, rather than comparative in nature. Concurrently, a rapid review design was used where the 'systematic-ness' (Bambra, 2011, p.16) of the design was used in order to systematically construe an evidence base to possibly inform future research and interventions, as argued previously. According to Grant and Booth (2009), a rapid review is a specific type of systematic review, which, "seeks to systematically search for, appraise and synthesise research evidence, often adhering to guidelines on the conduct of a review" (Grant & Booth, p. 95). This streamlined approach (Ganann, Ciliska & Thomas, 2010) addressed a systematic review's limits by utilising a limited time frame (Schünemann & Moja, 2015), fewer reviewers, and more detailed and strictly specified review questions, which limits the amount of resources applicable to the study (Schünemann & Moja, 2015; Ganann, et al., 2010; Grant & Booth, 2009), with language limits (The Johanna Briggs Institute, 2014; Ganann, et al., 2010), fewer databases, exclusion of grey literature, and limited categories of data extracted (Ganann, et al., 2010). The benchmark validity of a systematic review was not compromised as the researcher still adhered to the guiding principles and methods of systematic reviews (Shünemann & Moja, 2015), to ensure that the qualities of formality, transparency and replicability were achieved (Bambra, 2011). Furthermore, the rapid review process and methodology were executed and reported on in a

transparent way, in order to have remained sensitive towards what could have been lost in terms of rigour, bias and results (Ganann, et al., 2010).

### *Data-generation process*

Palm's (2013) integration of Melnyk and Fineot-Overholt (2005) and the American Dietetic Association's methodology (as re-explained by Handu et al., 2016) consists of seven broad steps. These seven steps were edited and utilised for the purpose of a rapid review: step 1 – developing a clear review question, step 2 – generating a search strategy, step 3 – executing the search and selecting relevant studies, step 4 – critically appraising and evaluating the methodological quality of selected studies, step 5 – extracting data and summarising all relevant studies, step 6 – synthesising the findings, step 7 – formulating conclusion statements. For the sake of conciseness, a brief overview of the key aspects of the data gathering process will be reported on.

### *Scope reviews*

A series of four scope reviews were done in consultation with a librarian to assess the viability of the study, to fine-tune the key words, to assess how key words should be defined within the Boolean operators, and finally to assess the relevance of the search results to the aim of the study. The final scope review, based on the reported list of key words (see Table 1) produced 923 results.

### *Final search terms*

After the final version of the review question was formulated, a protocol developed, and scope reviews conducted, final key search terms were determined. One stumbling block in identifying key words for this study was that there is an infinite list of high-risk sports. As this is an explorative rapid review, it is not crucial to include all high-risk sports. It was thus decided to include three general terms (high-risk sport, extreme sport and action sport) and in addition, to only specify those high-risk sports most popular and most researched on an



international scale (see Kupciw & MacGregor, 2012). The study further focused on those high-risk sports where the efforts and achievements of the participant were primarily dependent on physical strength and skill, and not the power, strength or safety that a motorised vehicle (e.g. a racing car, motorbike or aeroplane) provides. In the review, selective sports performed in the air, on land and on water were selected in order to obtain a picture that is representative of the full high-risk sport domain. See Table 1 for the final search terms.

[Insert Table 1 near here]

### *Databases*

The search, with the specified key words, was conducted through EBSCO Discovery Service (EDS), available on the North-West University's (NWU) database search portal. EDS provides an easy, powerful search platform where users can search 73 international and national databases including the most important databases relevant to this study, for example PsycINFO and PsycARTICLES, ERIC, SocINDEX; SPORTDiscus, MasterFILE Premier, MEDLINE, ScienceDirect, Expanded Academic ASAP, Academic Search Primer, Directory of Open Access Journals, CINAHL, JSTOR Journals, EBSCOhost, NWU-IR and SAE Publications.

### *Inclusion and exclusion criteria*

The following inclusion criteria guided the search: full-text, peer-reviewed, empirical journal articles; empirical PhD theses; empirical chapters in textbooks and e-books; studies published in English or Afrikaans; studies published since 1985 (this is when SDT was initially developed); empirical studies following either quantitative, qualitative or mixed-method approaches. Exclusion criteria included any systematic reviews, conference proceedings, masters' dissertations or mini-dissertations, non-research / non-empirical reports, letters and commentaries.

### *Formal search strategy*

The commencement of the formal search entailed compiling a list of studies for critical appraisal. Palm (2013) suggests screening an evaluation of compatibility at four different levels. The research strategy (as described earlier) was employed and thoroughly recorded. At the first level *Titles* and *Abstracts* were screened in terms of relevance to the review question. Secondly, the studies selected were then screened against the inclusion and exclusion criteria. Next (level three), full text copies of the studies that remained, were obtained and again screened for relevance until the final list for critical appraisal was compiled (level four). The researcher checked and discussed with the research supervisor those articles that were unclear in an attempt to resolve discrepancies. See *Figure 1* for the search results.

[Insert Figure 1 near here]

### *Critical appraisal*

The goal of this phase was to ascertain the quality of the selected studies – whether the studies' findings were valid, credible and trustworthy. For qualitative studies this was determined by the rigour of the research design and the quality of reporting on the findings (Godfrey & Harrison, 2015). Quantitative quality was determined by investigating methodological rigour of the corresponding research design (Godfrey & Harrison, 2015). The overall bias (such as selection-, performance-, measurement- and attrition bias) of the study needed to be low, whilst the internal and external validity had to remain high (Godfrey & Harrison, 2015; Kitchenham, 2004).

Critical appraisal was mostly completed by the researcher, and if there were any uncertainties or difficulties the study leader further evaluated the studies. Critical appraisal was done with a previously determined, standard set of criteria based on the author's adaptation of the Quality Appraisal and Review Instrument (QARI) from the Johanna Briggs

Institute (JBI) (JBI, 2014). The criteria included that (i) the research is relevant to the aim of this study; (ii) there is congruity between the research methodology and the research question or objectives, (iii) there is congruity between the research methodology and the presentation and analysis of data, (iv) there is congruity between the research methodology and interpretation of the results, (v) the research has been ethically approved by a governing body, (vi) conclusions drawn in the research report flow logically from the analysis and interpretation of the data. For an article to have been selected it had to satisfy criteria one, and at least three other criteria.

#### *Data extraction and synthesis*

The JBI data extraction templates (JBI, 2014) for qualitative and quantitative studies were integrated to include the following information: title, authors, date of publication, research design and approach, aims and objectives, participants, data analysis techniques, and findings or conclusions. Hereafter applicable information from different sources was integrated and synthesised to form themes and sub-themes. Firstly, qualitative and quantitative evidence were translated into the same language. Quantitative evidence was translated into qualitative data by creating a qualitative thematic description of the data. Both qualitative and quantitative data was thus analysed by using a meta-analytic approach (Godfrey & Harrison, 2015). Godfrey and Harrison (2015) from the JBI's proposed three steps were used namely:

Step 1: Identifying findings (as indicated on the data extraction sheet)

Step 2: Grouping findings into categories

Step 3: Grouping categories into synthesized findings

Finally, key conclusion statements were derived from the synthesised findings. This entailed a summary of the evidence from the research (Palm, 2013). Conclusion statements were, however, dependent on the rigour of the studies, which were used to extract data.

## **Ethical considerations**

Ethical risks were limited as no participants were directly involved in this study. However, the guidelines of Wager and Wiffen (2011) regarding accuracy, transparency, as well as avoidance of fabrication, falsification or plagiarism were followed. In addition, the researcher did attempt to uphold scientific integrity by using the strategies for establishing rigor and trustworthiness, which further served to enhance the relevance of this review findings. The researcher, guided by the study leader, strived to maintain professional competence at all time.

## **Results**

Sixteen studies were included in the review (see Table 2). Publication dates ranged from 1985 to 2017 with most of the studies (9) published since 2010. Eleven studies followed a quantitative research design (Barlow et al., 2013; Castanier et al., 2011; Castanier, Le Scanff & Woodman, 2010a; Ewert, 1985, 1994; Ewert, Gilbertson, Luo & Voight, 2013; Fave, Bassi & Massimini, 2003; Llewellyn & Sanchez, 2008; Podlog et al., 2015; Woodman et al., 2010; Woodman, Cazenave & Le Scanff, 2008) while five used a qualitative design (Allman, Mittelstaedt, Martin & Goldenberg, 2009; Burke, Durand-Bush & Doell, 2010; Jones, Milligan, Llewellyn, Gledhill & Johnson, 2017; Kerr & Mackenzie, 2012; Kiewa, 2001).

[Insert Table 2 near here]

Although the review included studies on several different high-risk sports, the majority focused on mountaineering and rock climbing, or other sports in conjunction with climbing (Barlow et al., 2013; Burke et al., 2010; Castanier et al., 2010a, 2011; Ewert, 1985, 1994, Ewert et al., 2013; Fave et al., 2003; Jones et al., 2017; Kerr & Mackenzie, 2012; Kiewa, 2001; Llewellyn & Sanchez, 2008; Woodman et al., 2010). Other sports included BASE-jumping (Allman et al., 2009), downhill skiing (Castanier et al., 2010a; Podlog et al.,

2015), skydiving (Barlow et al., 2013; Castanier et al., 2010a; Woodman et al., 2008), paragliding (Castanier et al., 2010a), hang-gliding (Kerr & Mackenzie, 2012), kayaking and canoeing (Ewert et al., 2013), trans-atlantic rowing (Woodman et al., 2010) and riversurfing (Kerr & Mackenzie, 2012).

Six main themes were identified from the analysis, namely (i) sensation-seeking; (ii) risk-taking as challenge; (iii) control and autonomy; (iv) self-regulation; (v) social dimension; and (vi) the self.

### ***Sensation seeking***

A number of studies reported sensation seeking as a potential motivational factor (Allman et al., 2009; Barlow et al., 2013; Castanier et al., 2010a; Ewert et al., 2013; Jones et al., 2017; Kerr & Mackenzie, 2012; Llewellyn & Sanchez, 2008). In these studies, sensation seekers are explained as individuals who are willing to take risks in order to experience the rewarding sensations, such as the rush of adrenalin or other novel, strong, pleasurable physical felt experiences (Barlow et al., 2013; Ewert et al., 2013; Llewellyn & Sanchez, 2008). Kerr and Mackenzie (2012, p. 656) report that the seeking of "pleasurable kinaesthetic bodily sensations" might serve the function of escape from boredom for some. Jones et al. (2017), however, report that the need for novel experiences cannot always be equated to thrill or sensation seeking as the benefit or excitement of the pursuit of these intense experiences rather arises from the inherent challenge that the sport holds. Excitement from the high-risk activity is influenced by the level of experience, as experienced participants are less motivated by sensation seeking needs (Llewellyn & Sanchez, 2008), and the activity type (Kerr & Mackenzie, 2012). Although exhilaration and excitement seeking was also found to be a motivational factor for high-altitude mountaineering (Podlog et al., 2015), mountaineers in general have a lower need for sensation seeking than skydivers (Barlow et al., 2013). This is logical, as mountaineering is a non-traditional high-risk sport where the long trips are not

typically saturated with intense sensation eliciting events (Fave et al., 2003). It is rather monotonous and pleasure from the activity is often obtained retrospectively. Sensation seeking is, however, also an important motive in other high-risk sports such as riversurfing, specifically if the individual has already mastered the activity (Kerr & Mackenzie, 2012), and in BASE-jumping where participants are motivated to experience an adrenalin rush (Kerr & Mackenzie, 2012).

### ***The challenge of risk-taking***

Although risk was noted as a motivational factor in some studies (Ewert, 1985; Llewellyn & Sanchez, 2008), Ewert (1994) noted that the need for risk was not found to be that important, as the pursuit of risk was poorly related to the reason for engaging in the activity. High-altitude mountaineers climb for other reasons than the pursuit of risk (Ewert, 1994; Fave et al., 2003) and they also view risk differently from the general public (Ewert, 1994). Risk is valued as it provides a means to experience flow (Fave et al., 2003), and provides a sense of challenge (Jones et al., 2017). High-risk sportspeople appear to accept risk and prepare themselves for it (Jones et al., 2017), but again risk in itself does not inherently motivate them. Challenge as a consequence of risk, and especially the consequent task mastery experience, was reported to be an important motivation in high-risk sport (Jones et al., 2017; Kerr & Mackenzie, 2012). Overcoming challenges is thus an important experience for these individuals (Jones et al., 2017), as it relates to the achievement of goals (Jones et al., 2017; Kerr & Mackenzie, 2012; Llewellyn & Sanchez, 2008). High-risk sport participants set difficult goals in relation to risk-taking (Llewellyn & Sanchez, 2008) and the achievement of these goals was found to be a primary motive for winter climbers (Jones et al., 2017).

Another essential part of challenge is that the high-risk sport domain enables participants to develop new skills (Allman et al., 2009; Jones et al., 2017) such as decision-

making abilities (Ewert, 1985, 1994), to test their personal abilities (Jones et al., 2017; Kerr & Mackenzie, 2012), to experience progress within these abilities (Jones et al., 2017) and to ultimately develop confidence in their skillset (Jones et al., 2017). All of these factors further motivate engagement in high-risk sport.

More experienced high-risk sport participants have a stronger need for challenge and personal testing (Ewert, 1985), yet at the same time, they tend to take fewer risks (Llewellyn & Sanchez, 2008). Inexperienced participants, on the other hand, are found to take more risks when leading a climb (Llewellyn & Sanchez, 2008). Both experienced and inexperienced high-risk sport participants are equally motivated by the development of decision-making abilities (Ewert, 1985, 1994). Finally, while men tend to take more risks than women, age was not found to predict risk-taking, although age and risk-taking were strongly correlated (Llewellyn & Sanchez, 2008).

### ***Control and autonomy***

Control and autonomy are both directly associated with self-determination, more specifically with the intrinsic-extrinsic continuum of motivation. Inexperienced rock-climbers are reported to have an external locus of control, motivated by external rewards such as recognition and social activities, as well as autotelic motivations such as the need to escape (Ewert, 1985). External regulation, or a controlled motivation orientation is also negatively related to athlete engagement (Podlog et al., 2015). Youth skiers that are amotivated (and thus experience non-regulation according to SDT), have poor engagement in their sport as well as a lack of purpose and goals (Podlog et al., 2015).

In contrast, an internal locus of control is more evident in experienced rock-climbers (Ewert, 1985, 1994). Fave et al. (2003) also found that the more experienced climbers become, the more they search for autotelic benefits in an activity, meaning that they are intrinsically motivated or driven. Therefore, they partake in expeditions because they want to,

and not because of external rewards. For an experience to be intrinsically motivated, however, it has to be deliberately and willingly embraced (Kiewa, 2001). Therefore, when it is structured by others the participant may experience frustration, or if during the activity the participant is too focused on others the individual may miss the opportunity to experience competence (Kiewa, 2001).

Autonomous motivation (including intrinsic motivation and identified regulation) was also found to be associated with the satisfaction of the three needs of autonomy, relatedness, and competence in youth downhill skiers (Podlog et al., 2015). Intrinsic motivation was also partially mediated by the relationship between competence and engagement, elucidating the important need of feeling competent in order to stay motivated (Podlog et al., 2015). Identified regulation was related to interest, enjoyment and personal fulfilment that the high-risk sport activity brings (Podlog et al., 2015). Thus, when skiers feel autonomous they are more likely to be motivated for intrinsic reasons, which fosters engagement (Podlog et al., 2015).

Finally, the experience of intrinsic motivation in high-risk sport participants was found to be related to the experience of flow, and as a result Fave et al. (2003) suggest that high-risk sport such as mountaineering serves as an avenue to experience flow. Flow is, however, also predicted and influenced by personality variables (Ewert, 1985).

Just as in risk-taking, the level of experience also seem to influence motivational orientations. Ewert (1985 & 1994) found experienced high-risk sport participants to have an intrinsic orientation in contrast to inexperienced high-risk sport participants who have an external motivation orientation. Inexperienced high-risk sport participants are specifically motivated by external rewards such as recognition and social activities, as well as autotelic motivations such as the need to escape (Ewert, 1985).



## *Self-regulation*

Regulation was a pervasive theme in most research reviewed, although somewhat implicit. Two sub-themes emerged, namely 'behavioural regulation', which refers to any adaptive adjustment in behaviour due to feedback received about the success of goal attainment, while 'emotional/affect regulation' refers to the different processes underlying the adjustments in emotions or felt experiences to achieve a desired emotional experience (Barlow et al., 2013).

### *Behavioural self-regulation*

In order to regulate their behaviour, climbers adopt a dynamic behavioural strategy that considers difficulty, type of route and style of climbing that will be employed (Llewellyn & Sanchez, 2008). Thus, they regulate their behaviour to take calculated risks when engaging in climbing and this reflects their strong self-efficacy beliefs (Llewellyn & Sanchez, 2008). A strong awareness of their own abilities is reported to be important for the climbers' confidence when they ascend routes (Jones et al., 2017). Other strategies that climbers employ to regulate their behaviour, apart from efficacy-related regulation, is to visualize successful ascents (Jones et al., 2017), and to be fully focused (Castanier et al., 2010a). Lastly, climbers also use dissociation as a regulation strategy where they detach from their felt emotions during their climbing experience (like anxiety and fear) in order to continuously and effectively regulate their behaviour (Jones et al., 2017). They become less aware of their emotions, their problems and their selves whilst immersing themselves in the activity. This need to be 'unselfconscious' was reported as a possible motivation to engage in extreme sports (Kerr & Mackenzie, 2012).

### *Emotion/affect regulation*

High-risk sport is specifically seen as an avenue for overcoming fear and anxiety (Kerr & Mackenzie, 2012), as it regulates the physiological arousal associated with these

emotions. It is important to note that emotional regulation was mostly limited to anxiety as emotion (Castanier et al., 2011), and primarily to minimise negative affect rather than to increase positive affect (Castanier et al., 2011). Although increased levels of somatic anxiety is normal during high-risk sport activity, the interpretation thereof appears to be key in the regulation experience (Jones et al., 2017). Mastery of the high-risk sport experience served to mediate and reframe the debilitating effects of cognitive anxiety (Jones et al., 2017). The extreme risk involved in mountaineering is an important part of the activity because it requires a high level of attention to successfully complete the activity, which inevitably shifts away the attention from the anxiety experienced (Castanier et al., 2011). Experienced climbers, in particular, have a better ability to regulate their felt experiences and to minimize the effects of diminishing motivation (Burke et al., 2010).

Furthermore, individuals who suffer from alexithymia may be more inclined to engage in high-risk sport. Alexithymic women were reported to engage in skydiving as it serves an emotional regulation purpose by lowering their anxiety levels after the jump (Woodman et al., 2008). The benefits of skydiving were, however, short lived, with the implication that the individual may become dependent on continuous engagement in high-risk sport to regulate affect (Woodman et al., 2008). Alexithymic trans-atlantic rowers were found to have a greater ease with identifying their emotions post-row (Woodman et al., 2010). They also experienced increased emotional expression and found some relief from emotional difficulties when they were engaged in rowing (Woodman et al., 2010). In contrast, women who are not alexithymic were not found to be motivated by changes in anxiety (Woodman et al., 2008).

However, not all high-risk sport participants derive an emotion regulation benefit from the sport. The review showed that those who predominantly use compensation-related emotion regulation strategies do not engage in high-risk sport with the motivation to regulate

negative emotion (Castanier et al., 2011). Those that use escape-based emotion regulation strategies, however, are more likely to benefit from emotion regulation benefits in the high-risk sport domain (Ewert, 1985). One escape-based strategy is that of being less aware or conscious of the self and its emotions, as described earlier as the process of achieving the desired level of 'unselfconsciousness' (Kerr & Mackenzie, 2012). Thus, those who cope with a dysphoric mood by turning attention away from the self, use high-risk sport as an escape from self-awareness strategy to cope with their negative affect, as a lowering in self-awareness results in the lowering of anxiety (Castanier et al., 2010a, 2011). This need for escape was more important for experienced rock climbers (Ewert, 1985). For them it also serves as a disengagement avenue from normal life (Ewert, 1994). Anxiety self-regulation processes are thus specific to high-risk sport, but only those that primarily engage in escape-oriented regulation appear to derive this specific benefit (Castanier et al., 2011).

In addition, the emotional regulation abilities of high-risk sport participants also helped them to be proficient in their activity. Mountaineers stay motivated when under extreme stress by feeling the way they want to as often as possible, and as close to ideal standards as possible (cf. Burke et al., 2010). That is, they are aware of and change their felt experience to feel strong, challenged, accomplished and connected to the mountain in order to stay motivated (Burke et al., 2010). They are also more mindful and effective in reconnecting with how they want to feel when faced with obstacles (Burke et al., 2010). This implies an increased awareness of their own ability and heightened self-efficacy beliefs (Burke et al., 2010; Jones et al., 2017). Thus, their ability to feel is regulated by increased self-awareness and self-monitoring (Burke et al., 2010). This strategy is also used before initiating a climb, when they prepare to feel a certain way via different avenues (Burke et al., 2010).

Self-efficacy, agency and mastery seem to be important concepts for emotional regulation. In this regard, 'agency' refers to the ability of exerting intentional influence on certain behaviour, or to be an active roleplayer that can exercise chosen behaviours (cf. Barlow et al., 2013). Agency is influenced by self-efficacy beliefs (Barlow et al., 2013). Athletes' perceptions of their fitness or abilities (self-efficacy beliefs) are integral in controlling anxiety during a climb (Jones et al., 2017), as well as the interpretation of this anxiety. Participants of high-risk sport may, however, have greater expectations of their emotional regulation and agency than others (Barlow et al., 2013). Rather than being motivated by difficulties with emotional regulation and agency, they may be motivated because of the higher regulation and agency standards that they uphold for themselves. Thus they engage in high-risk sport to satisfy their greater than normal need or expectation of regulation and agency, or to challenge their own limits (Barlow et al., 2013). Regardless, agentic action is a requisite in all high-risk sports, despite contextual differences (Barlow et al., 2013). Based on the importance of agency in emotion regulation, Barlow et al. (2013) introduced the concept of agentic emotion regulation (AER) (Barlow et al., 2013).

Mountaineers derive a perceived AER transfer benefit after participation in high-risk sport (Barlow et al., 2013). Control groups and skydivers did not experience this (Barlow et al., 2013), and it may be speculated that this is related to the longer engagement time in mountaineering. Similarly, trans-atlantic rowers were also found to use their sport as an unconscious AER function, if they were alexithymic (Woodman et al., 2010). They further experienced perceived interpersonal agency transfer benefits in relationships that require more trust – such as family or loving partner relationships (Woodman et al., 2010). It is important to note that their agency issues are positioned within the interpersonal, rather than intrapersonal, sphere (Woodman et al., 2010).

### *Social dimension*

Different factors related to the sociality of high-risk sport, motivate or keep individuals from taking part in the activity (Ewert et al., 2013). This is influenced, however, by the level of experience (Ewert, 1985) and by gender (Ewert et al., 2013), with women reporting to have more social needs than men in the high-risk sport context (Ewert et al., 2013).

#### *Togetherness as motivational factor*

Sharing of the high-risk sport-experience with others is motivation for some (Ewert et al., 2013): a sense of belonging is an important motivational factor for BASE-jumpers (Allman et al., 2009) while a sense of relatedness and the seeking of meaningful connections important to downhill skiers (Podlog et al., 2015). High-risk sport is also a vehicle to interact with friends and to pass knowledge to others (Kerr & Mackenzie, 2012). Experienced winter climbers value the camaraderie found in groups as it functions as a support mechanism through peer support and peer trust (Jones et al., 2017). This social aspect is a further motivational aspect for mountaineers, as this allow them to compare their achievements to others' and plan their future goals through social modelling processes such as peer review and peer feedback (Jones et al., 2017). Two studies commented on the importance of competition – for inexperienced rock climbers it is an important motivational factor (Ewert, 1994), while direct competition also motivates behaviour through peer rivalry (Jones et al., 2017).

#### *The value of being alone*

Some high-risk sport participants value these sports specifically because it entails aloneness (Castanier et al., 2010a). Climbers, for example, are reported to act in isolation to others (Jones et al., 2017). This may be because other-directedness minimizes one's ability to

experience competence, leading to a frustration of needs (Kiewa, 2001). Climbers also value the identity quality of independence (Kiewa, 2001).

### *The self*

Some participants engage in high-risk sport for the sake of regulating self-image, especially when compensation-oriented self-regulation strategies are used (Castanier et al., 2011). Self-image as motivational factor is influenced by the activity type (Ewert et al., 2013) and the experience level of the sportsperson (Ewert et al., 2013; Ewert, 1985) influencing, for example, the need for recognition in sport (Ewert, 1985). Engaging in high-risk sport further seems to form part of the sportsperson's identity (Kiewa, 2001). Rock climbers, specifically, value being seen as rock climbers by others and it also provides them with a distinctive view of the self (Ewert et al., 2013). They strive for an identity which upholds the characteristics of decisiveness, independence and competence (Kiewa, 2001), whilst they like to view themselves as masters of their domain (Jones et al., 2017). Inexperienced high-risk sport participants are especially motivated by aspects relating to self-image (Ewert, 1994) and a need for achievement and the social motive (Ewert, 1985, 1994).

This self-perception of a sportsperson seems to be of importance (Jones et al., 2017) as identity is found to be a major motivator for behaviour (Kiewa, 2001). Kiewa (2001) explains that identity and behaviour influence each other through self-reflexive processes. A secondary aspect of self-perception entails the accurate appraisal of abilities (Jones et al., 2017). For the successful engagement in high-risk sport, the interaction of perceived mental and physical abilities is of the utmost importance (Jones et al., 2017). Self-efficacy beliefs need to be reality-based and participants are reported to engage in physical and mental training (Jones et al., 2017) to achieve this.

Risk-related strategies were reported to be underpinned by self-efficacy beliefs (Llewellyn & Sanchez, 2008), the interplay of negative affectivity and escape-strategies

(Castanier et al., 2010a), as well as gender differences where men tend to take more risk and have higher self-efficacy beliefs (Llewellyn & Sanchez, 2008).

More experienced high-risk sport participants also engage in their sport as an avenue for self-expression and creativity (Ewert, 1994), and to help others (Ewert, 1994) whilst inexperienced high-risk sport participants are often motivated by disengagement from normal lives (Ewert, 1994). Allman et al. (2009) reported that BASE-jumpers are motivated to engage in the sport by spiritual and personal benefits. This may include the need to achieve more from life as the heightened expectation exists that there is more potential for both inter- and intrapersonal life (Barlow et al., 2013). Mountaineers, specifically when more experienced, are often motivated as their sport is an expression of creativity and utilisation of cognitive abilities (Ewert, 1994), connecting to the environment (Kerr & Mackenzie, 2012) and task mastery – by exploring the self and terrain through ascending unclimbed routes (Jones et al., 2017).

## **Discussion**

The 16 studies included in the rapid review provided dense information from different fields of study and theoretical vantage points. This illustrates that the high-risk sport context has been researched to some extent, but rarely if ever, directly in line with the purpose of this study. This review thus aimed to provide a systematically synthesised exploration of high-risk behaviour within the high-risk sport context, in order to gain insight into how motivation and regulatory styles associated with this context may be translated to other high-risk contexts. Based on the six themes identified in the review, the following interpretations can be made:

First, the review suggests that individuals who engage in high-risk sport activities cannot be seen as a homogenous, sensation seeking group, as previously suggested and commonly understood (Barlow et al., 2013; Castanier et al., 2010a; Llewellyn & Sanchez,

2008). This is in line with current literature arguing that the sensation seeking based understanding of risky behaviour is in essence flawed (Brymer & Schweitzer, 2013). It has become a catch-all category for high-risk behaviour, whilst both the sensation seeking concept as well as the motivation to engage in high-risk behaviour are multi-faceted (Kerr & Mackenzie, 2012; Llewellyn & Sanchez, 2008). In this review, engagement in high-risk sport was found to be dependent on a spectrum of motivations (Ewert et al., 2013) including the six themes reported on, namely sensation-seeking, risk-taking as a challenge, control and autonomy, self-regulation, social dimension, and the self. Within these motivations, themes of need satisfaction, mastery, self-determination and self-regulation frequently surfaced.

The review further suggests that sensation seeking and high-risk impulsive behaviour is in fact important within the high-risk sport context. Sensation seeking is seen as a major motivation to engage in high-risk sport but is not limited to pleasurable experiences but also as an avenue to being challenged (Jones et al., 2017) or to escape boredom (Kerr & Mackenzie, 2012). Not once was sensation seeking behaviour reported as detrimental to well-being or engagement in high-risk sport. Sensation seeking, high-risk behaviour is thus seen as adaptive and functional in this context, in contrast to other high-risk behaviours such as risky sexual decisions, overindulgent eating, drug abuse and reckless driving (Fletcher et al., 2013; Heatherton & Wagner, 2011).

From a SDT perspective it can be reasoned that some individuals engage in non-adaptive high-risk behaviour when their needs for competence, relatedness and autonomy are not met. Thwarting of need satisfaction leads to the adoption of extrinsically motivated goals, as the external rewards which serves to substitute need satisfaction (Deci & Ryan, 2008; Stavrou, 2008). Unconsciously an initial motive to engage in high-risk sport might also be unmet need satisfaction. This is suggested by inexperienced high-risk sport participants having external motivation orientations (Ewert, 1985) – being more motivated by external



rewards such as recognition and aspects related to self-image (Ewert, 1985, 1994), than their experienced counterparts.

High-risk behaviour is then, arguably, adaptive in the sporting context. In the high-risk sport context the personality variable of sensation seeking/impulsivity is expressed and developed, rather than inhibited or controlled as in traditional interventions focussing on impulsive behaviour. In this context, the expression of the trait appears to lead to the satisfaction of needs as illustrated by the six themes. The *need for relatedness* appears to be satisfied as indicated by the subtheme *togetherness*, in which the shared experience (Ewert et al., 2013), sense of belonging (Allman et al., 2009) and meaningful connections (Podlog et al., 2015), for example, motivate participation in high-risk sport. In contrast, the value of being alone seems to satisfy the *need for autonomy* – in this regard Jones et al. (2017) and Kiewa (2001) indicated that climbers often act alone in order to feel independent by making their own decisions. Another aspect related to autonomy-need satisfaction is the importance of agency brought about by being an active roleplayer in exerting intentional influence on certain behaviours and decisions (Barlow et al., 2013). Lastly, the fulfilment of *competency-based needs* is evident in the self-efficacy beliefs that high-risk sportspeople hold, as well as the experience of a sense of mastery as a consequence of the challenge that high-risk sport presents (Jones et al., 2017; Kerr & Mackenzie, 2012). Further evidence include a sense of goal-achievement (Jones et al., 2017), skill-development (Allman et al., 2009; Jones et al., 2017) as well as development of confidence in a specific skillset (Jones et al., 2017).

Furthermore, although it is not clear to what extent there is actual change due to and engagement in the high-risk sport context, the satisfaction of needs appears to influence the motivational orientation of the high-risk sport participants (Podlog et al., 2015). High-risk sport participants tend to be more intrinsically motivated than novice or inexperienced participants (Ewert, 1985, 1994; Fave et al., 2003; Podlog et al., 2015). In addition, an

intrinsic motivational orientation inherently entails intrinsic regulation which, according to Ryan, Huta, et al. (2008) leads to adaptive inherent autonomy. Thus, as needs are satisfied in the high-risk sport context, an individual becomes more intrinsically motivated, leading to increased levels of intrinsic regulation.

In the review, examples of increased regulation were plentiful. To achieve their high-risk sporting goals, sportspeople engaged in several behavioural self-regulation strategies, including taking calculating risks based on self-efficacy beliefs (Llewellyn & Sanchez, 2008), visualisation techniques (Jones et al., 2017), and turning attention away from the self (Kerr & Mackenzie, 2012). The high-risk sport context also served an emotion regulation function – this was especially reported as a reason for engagement in the sport for those who have alexithymia or those who use escape-based strategies to cope with a dysphoric mood or anxiety through focussed attention (Barlow et al., 2013; Castanier et al., 2010a, 2011).

Although no direct reciprocal links were found, the review suggests that when an activity becomes intrinsically motivated, emotion-regulation becomes inherent to the reason for engagement in the activity. For example, Burke et al. (2010) reported that experienced climbers have a superior ability in regulating their felt experiences, in relation to their inexperienced counterparts. This, in turn helps sportspeople to be more proficient in their sport (Burke et al., 2010).

In addition to increased regulation, an intrinsic motivation orientation also decreases the need for high-risk behaviour, as external rewards are no longer needed to compensate for unmet need satisfaction. The *challenge of risk-taking* theme demonstrates this as it was found that risk is not necessarily a motivational factor in itself, but rather motivates behaviour through the challenge that it brings. Specifically, experienced sportspeople are reported to have a bigger need for challenge and personal resting, but take fewer risks than inexperienced sportspeople (Ewert, 1985; Llewellyn & Sanchez, 2008). This implies that, if impulsive or

high-risk behaviour is expressed within an adaptive context where needs are met, the high-risk behaviour may in itself become less, or rather applied in a more regulated and adaptive way.

The expression of high-risk behaviour in an adaptive context does not only lead to need satisfaction, and the adaptive application of the trait, but also to the development of other strengths and abilities over time. These strengths and abilities may eventually lead to an increased sense of well-being, including intimate relationship quality (Woodman et al., 2010), development of sport skills based on modelling processes (Jones et al., 2017), self-image regulation (Castanier et al., 2011), more accurate self-appraisal (Jones et al., 2017), and self-expression and creativity (Ewert, 1994).

In summary, individuals may have a need for high-risk behaviour based on their unmet need satisfaction experience. High-risk behaviour thus provides the individual with external rewards, as this cannot be intrinsically elicited. When a new adaptive pathway for the expression, rather than the inhibition of high-risk behaviour is created (like the high-risk sport context), need satisfaction as well as the development of the individual's strengths takes place. Need satisfaction, changes the motivation and regulation style of the individual from extrinsic to intrinsic, diminishing the need for high-risk behaviour and compensatory external rewards as need substitutes. Ultimately an autonomous motivational orientation and consequent intrinsic regulation leads to an increase in well-being as more needs are satisfied.

Theoretically it is possible that certain high-risk sport contexts may act as pathways for the expression of high-risk behaviour, rather than the inhibition thereof. This is an important contribution that can possibly aid self-regulation interventions.

### **Limitations**

Before a final conclusion can be made, some limitations need to be considered. Although a rapid review is not a limitation in itself, it is important to remember that the aim

was to explore, rather than to determine the nature of self-determination and regulatory styles within the high-risk sport context. In addition, not all possible resources were considered for inclusion. In the light of this, care was taken not to make any strong claims in the conclusion, but rather to use the findings to develop new avenues for further research.

### **Conclusion**

The aim of this rapid review was to explore and synthesize the scientific literature in order to understand the nature and dynamics of self-determination and regulatory styles in high-risk sport contexts. Sixteen studies were included in the review, which yielded six main themes, namely sensation-seeking, risk-taking as a challenge, control and autonomy, self-regulation, social dimension, and the self. SDT was used to integrate these themes and it was concluded that high-risk sport may serve as an adaptive pathway to express, rather than inhibit high-risk and impulsive behaviour (like most current regulation interventions do). In an adaptive context, such as the high-risk sport domain, this leads to increased need satisfaction, in accordance with SDT. Ultimately, an autonomous motivational orientation and concurrent intrinsic regulatory style may develop, leading to a more regulated expression of high-risk behaviour as well as developing other strengths. Caution is advised on the interpretation of these findings, as more research is needed to explore the viability and practicality of what was theoretically explored.

### ***Further directions***

It is important, based on the explorative nature of the study that recommendations will primarily focus on future research, rather than on clinical practice. Firstly, more research is needed to explore and determine if the diversity in motives for engagement in high-risk sport also reflect those for engagement in non-adaptive risk-behaviour. Secondly, more research is needed to test the practical potential of what was found. This will entail the confirmation of aspects and intricacies such as the extent to which engagement in high-risk sport would be

effective for people with a history of non-adaptive high-risk behaviour, and which sports are most applicable for which dysfunctions, as well as the overall viability of such interventions. From the current literature it appears as if the non-traditional high-risk sport of rock-climbing may especially be useful for individuals who seek improvement in well-being, rather than the treatment of disorders. The rock-climbing context also provides a safe space to exercise high-risk behaviour, for example in a climbing gym.

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Table 1: Final search terms.

Field	
Abstract	<p>"high-risk sport*" OR "extreme sport*" OR "action sport*" OR "extreme adventure" OR "rock climb*" OR mountaineer* OR "mountain climb*" OR "bouldering" OR "free climb*" OR "solo climb*" OR "ice climb*" OR alpinist* OR "caving" OR "elite climb*" OR "extreme climb*" OR "whitewater kayak*" OR "whitewater canoe*" OR "whitewater raft*" OR "waterfall kayak*" OR "waterfall canoe*" OR "waterfall raft*" OR "sky-div*" OR parachuting OR "paraglid*" OR "ski-jump*" OR "downhill ski*" OR "snow board*" OR "base-jump*" OR "extreme surf*" OR "big wave surf*" OR slacklining OR highlining OR "wingsuit flying" OR "snow skiing" OR "snow kiting"</p>
	AND
Abstract	<p>sdt OR need* OR "self-determin*" OR motivation* OR competenc* OR autonom* OR relatedness OR intrinsic* OR extrinsic* OR "self-regulation" OR regulation OR "regulat* style" OR "loc* of control" OR agency</p>

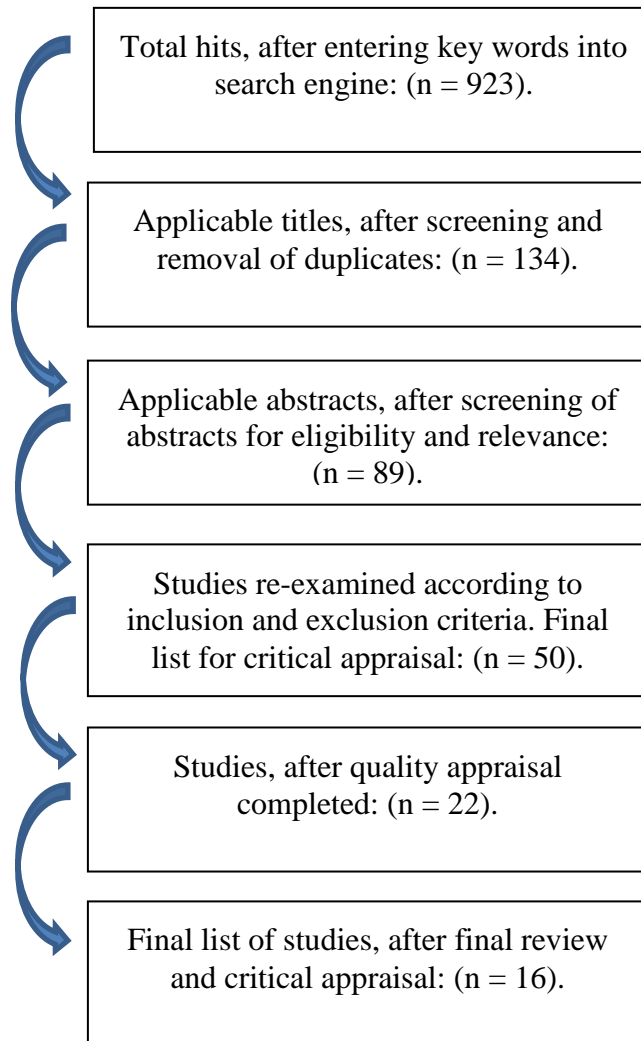


Figure 1: Search strategy results

Table 2: Data extraction sheet

No.	Title	Authors	Date, and type, of publication	Research design and approach	Aims and objectives	Participants (sample size and description)	Data analysis techniques	Summarised findings and conclusions.
1.	Beyond sensation seeking: Affect regulation as a framework for predicting risk-taking behaviors in high-risk sport.	Castanier, C., Le Scanff, C., & Woodman, T.	2010 Journal Article	Quantitative	1. To examine the affect regulation framework as a predictor of risk-taking behaviours in high-risk sports 2. To examine the contribution of emotion regulation to risk-taking behaviours over and above sensation seeking.	265 French men, practicing one of the five following high-risk sports as their main sport activity: downhill skiing (42), mountaineering (102), rock-climbing (31), paragliding (32), or skydiving (58).	Measures: -Risk-Taking Behaviors Scale. -Positive and Negative Emotionality Inventory. -Risk and Excitement Inventory (REI) -Sensation Seeking Scale (SSS-V).  Analysis: -Parametric and multivariate analysis. -Moderated hierarchical regression analyses.	There exists a negative affectivity x escape strategy interaction in predicting risk-taking behaviours. The adoption of risk-taking behaviours in high-risk sports served an affect regulation function only for those individuals who cope with their dysphoric mood by turning attention away from the self (i.e., escape from self-awareness strategy).
2.	Beyond "because it's there": Motivations for pursuing adventure recreational activities.	Ewert, A., Gilbertson, K., Luo, Y. C., & Voight, A.	2013 Journal Article	Quantitative research design - questionnaire	Investigation of the reported motivations for participation in adventure recreation over a six-year period using the independent variables of gender, experience and activity type.	930 respondents. Engaged in rock-climbing, whitewater kayaking, sea kayaking, or canoeing.	Measures: -40-item questionnaire, adapted from a study by Ewert & Hollenhorst (1989). It included a level of experience index and a motivation index.  Analysis: -An explanatory factor analysis (EFA). -Three-way ANOVA's. -Stepwise discriminate analysis.	Engagement is related to a spectrum of motivations consisting of three equally important factors, namely social factors, sensation seeking factors and aspects related to self-image. This spectrum of motivation can be connected to three variables, which influence these motives: level of experience, type of activity, and gender. Engagement is dependent on individual, specific nature of activity, and experience level of person.
3.	Control over self and space in rock-climbing.	Kiewa, J.	2001 Journal Article	Qualitative research design - constructivist and symbolic interactionist approach.	-To explore the nature of control in the climbing context, thereby contributing to an understanding of the importance of self-determination leisure behaviour. -To determine the extent to which belief in a particular identity forms a motivating factor for behaviour.	17 men and 14 women rock-climbers from Australia.	Measures: -Researcher's reflective diary -Participants' diary for 6 months  Analysis: -Contents of diaries were transcribed and analysed using a NUD*ST program for a computerised analysis of qualitative data. -This led to the development of questions for a semi-structures in depth interviews that were taped. -Interviews analysed, proposals formulated and feedback were sought from the participants. All information analysed via NUD*ST program.	-There is a relationship between control over structure of the activity and flow experienced. Control can only be achieved when the activity is deliberately and willingly embraced. -Self-determinism plays and important role in motivating people in climbing. It enables them to manage fear and act competently in an environment over which one deliberately exerts little control. -The view that identity is a major motivation for behaviour was supported. Behaviour and identity are mutually constitutive.
4.	Exploring feel and motivation with recreational and elite Mount Everest climbers: An ethnographic study.	Burke, S. M., Durand-Bush, N., & Doell, K	2010 Journal Article	Qualitative research design - ethnographic approach.	Exploration of the multidimensional experience of feel and motivation of a small group of Mount Everest climbers, in order to shed light on factors that sustained their drive toward reaching their goals.	4 male participants that were attempting to climb Mount Everest. Two were considered recreational climbers and two experienced or elite mountaineers.	Data collection: -Interviews (minimum of five individual interviews per participant) -Observations – daily observation that were reflected in the extensive field notes  Data analysis: -Qualitative analysis of the interview transcripts and field notes.	-Some athletes stay motivated under extreme duress by feeling the way they want as often as possible or as close to ideal standards as possible. The data suggest that elite and recreational climbers may desire to physically, cognitively, emotionally, and spiritually feel different ways, including feeling strong, challenged, accomplished, and connected with the mountain. -Climbers can prepare to feel a certain way by using different meaningful strategies, suggesting that one's ability to feel may be regulated and heightened through increased self-awareness and self-monitoring. -Climbers may also be mindful to reconnect with their desired feel when it is obscured by different types of obstacles. One's ability to do this may be influenced by the level of experience, achievement orientation and established goals.
5	Exploring the motivations of BASE jumpers: Extreme sport enthusiasts.	Allman, T. L., Mittelstaedt, R. D., Martin, B., &	2009 Journal Article	Qualitative - Mass-end approach via semi structured interviews.	To explore motivations for participation in the extreme sport of BASE jumping by applying a means-end theoretical framework	54 registered jumpers who met the minimum BASE jumper criteria.	Measures: 5-20 minute interviews  Analysis: -Thematic analysis utilising	A wide range of positive motivations for continued participation in BASE jumping are present. The most prevalent motivations included: acquiring a new, elite skill; experiencing a sense of accomplishment; having an adrenaline rush; being in control, overcoming fear; having a sense of belonging; and personal/spiritual motivations.

No.	Title	Authors	Date, and type, of publication	Research design and approach	Aims and objectives	Participants (sample size and description)	Data analysis techniques	Summarised findings and conclusions.
		Goldenberg, M.					Laddermap software resulting in an implication matrix. -Means-end associations between concepts were graphically portrayed in a Hierarchical Value Map.	
6.	Great expectations: Different high-risk activities satisfy different motives.	Barlow, M., Woodman, T., & Hardy, L.	2013 Journal Article	Quantitative	-To challenge the view that all high-risk activities are the same and motivated simply by sensation seeking. -Aimed to examine the different motives that drive participation in two contextually specific high-risk activities—skydiving and mountaineering—from sensation seeking, emotion regulation, and agency perspectives.	Study 2: 35 experienced skydivers, 28 mountaineers, and 28 low-risk sport participants.  Study 3: 41 skydivers, 39 mountaineers, and 32 low risk sport participants.  Study 4: 100 skydivers, 46 mountaineers, 47 low risk sport participants	<b>Study 2:</b> Measures: -The Sensation Seeking, Emotion Regulation, and Agency Scale (SEAS)  Analysis: -Univariate analyses -Analyses of variance (ANOVA) -Bronferroni test -Analyses of covariance (ANCOVAs) -Bryant-Paulson test  <b>Study 3:</b> Measures: -SEAS -Sensation Seeking Scale V -Emotional Intelligence Scale -Lack of Mastery subscale from Pearlin and Schooler's inventory. -Ten Item Personality Inventory -Balanced Inventory of Desirable Responding  Analysis: -Univariate analyses -Analyses of variance (ANOVA) -Bronferroni test -Analyses of covariance (ANCOVAs) -Bryant-Paulson test  <b>Study 4</b> Measure: -SEAS  Analysis: -Discriminant function analysis (DFA)	-Different motives exist for voluntary risk taking. Skydivers are motivated by the sensation rewards of their activity, and mountaineers are motivated by the agentic emotion regulation processes of their activity. -Risk takers can be motivated by the possibility of a better future state through an elevated expectancy of their intrapersonal and interpersonal life. -Individuals expect to experience greater emotion regulation and agency during their high-risk activity compared to their other life domains. -Agentic emotion regulation that benefits are perceived to transfer to other important aspects of everyday life. -Mountaineers have greater emotion regulation and agency expectancies of everyday life. They seek a means of achieving more in life in the high-risk domain.
7.	Individual differences and risk taking in rock-climbing.	Llewellyn, D. J., & Sanchez, X.	2008 Journal Article	Quantitative cross sectional design.	To study the relationship between selected individual differences and risk-related behavioral strategies in rock-climbing.	116 active rock-climbers.	Measures: -Impulsive-sensation seeking scale – Imp-SS -A domain specific self-efficacy scale: Physical Self-Efficacy Scale (PSE) -Behavioural measures of ability, experience and risk taking in rock-climbing.  Analysis: Descriptive statistics, correlations, hierarchical regression analysis, sensitivity analyses.	To challenge themselves some rock-climbers may set difficult goals and take calculated additional risks when they feel confident in their ability to manage those risks. Researchers should not assume homogeneity within risk taking populations, or that people take risks in all domains due to elevated sensation seeking needs.
8.	Multiple motives for participating in adventure sports.	Kerr, J. H., & Mackenzie, S. H.	2012 Journal Article	Qualitative design - inductive-deductive	To explore possible multiple motives for participation in different adventure sports.	5 expert adventure sport participants.	Scanlan Collaborative Interview Method (SCIM)	The motives for adventure sport participation were: risk taking (e.g., excitement, "adrenaline rush"); goal achievement (e.g., winning competitions, becoming a teacher); social motivation (e.g., interaction with friends, passing on knowledge to students); escape from boredom; testing personal abilities and overcoming fear; connecting with the natural environment;

No.	Title	Authors	Date, and type, of publication	Research design and approach	Aims and objectives	Participants (sample size and description)	Data analysis techniques	Summarised findings and conclusions.
				approach informed by reversal theory.				unselfconsciousness; and pleasurable kinaesthetic bodily sensations from moving in water or air. There are multiple motives for participation in adventure sports which include, but also go beyond, sensation-seeking.
9.	Motives for participation in prolonged engagement high-risk sports: An agentic emotion regulation perspective.	Woodman, T., Hardy, L., Barlow, M., & Le Scanff, C.	2010 Journal Article	Quantitative - cross-sectional design	To explore the agentic emotion regulation function that prolonged engagement in high-risk sports (ocean rowing and mountaineering) may serve.	Study 1: 20 transatlantic rowers.  Study 2: 24 male mountaineers who have completed alpine routes.  Control groups: 68 non-mountaineering participants	Study 1 Measures: - Toronto Alexithymia Scale (TAS-20) - Spheres of control (SOC)  Procedure: Pre-race semi-structured interviews. Post-event interviews  Study 2 Measures: - The Personal Agency in Interpersonal Relationships (PAIR) scale - TAS-20  Procedure -Single factor randomized ANOVA. -Tukey's post hoc tests. -Independent samples t-test.	Adventurous high risk sports people have difficulty describing emotions and feel a lack of agency in intimate relationships. They find some respite from this difficulty by actively regulating their emotions away from home in the high risk domain. Although this emotion regulation provides an increased sense of emotional agency, any such changes are likely transitory because the underlying difficulty with expressing emotion reflects a trait deficit. As the emotion regulation has not been addressed at its core (interpersonal relationships) the high-risk adventurer will likely continue to feel a strong pull toward repeating high risk adventures in order to feel momentary respite from other domains.
10.	Motivational orientation and risk taking in elite winter climbers: A qualitative study.	Jones, G., Milligan, J., Lewellyn, D., Gledhill, A., & Johnson, M. I	2017 Journal Article	Qualitative-inductive design.	To explore the experiences of elite winter climbers in terms of their motivational orientation and risk-taking behaviour.	4 elite male winter climbers	Measures: -Semi-structured interviews. -Personal research diaries.  Analysis: -Thematic analysis. -An iterative approach whereby emergent themes led to further informal data collection and analysis to allow ideas to develop.	Enactive mastery and engendered disinhibition are key behavioural and psychological determinants that influenced individuals to be able to undertake more difficult and riskier forms of winter climbing. Goal achievement was their primary motive which was set within a confidence frame encapsulated within these superordinate themes.
11.	Mountaineering as affect regulation: The moderating role of self-regulation strategies	Castanier, C., Le Scanff, C., & Woodman, T.	2011 Journal Article	Quantitative	Investigation of the change in mountaineers' affect from pre- to post-mountain route and the moderating role of self-regulation strategies in this process.	105 mountaineers and 73 judokas	Measures: -Risk and Excitement Inventory. -Positive and Negative Emotions Scale (trait version).  Analysis: -Regression analyses. -Single factor repeated measures. -ANCOVAs. -Moderated hierarchical regression analyses.	Only escape from self-awareness as a self-regulation strategy resulted in significant changes in negative affect intensity, specifically a decrease in anxiety, from pre- to post-mountain route.
12.	Need satisfaction, motivation, and engagement among high-performance youth athletes: A multiple mediation analysis.	Podlog, L., Gustafsson, H., Skoog, T., Gao, Z., Westin, M., Werner, S., & Alricsson, M.	2015 Journal Article	Quantitative – completion of questionnaires.	To examine whether the various types of motivation articulated in self-determination theory (SDT) mediated the relationship between basic need satisfaction (i.e. competence, autonomy, and relatedness) and athlete engagement.	192 Swedish downhill skiers aged 15-20 years.	Measures -Intrinsic Motivation Inventory -A 6-item scale developed by Holmbeck and Amorose (2005) -Sport oriented version of Richer and Vallerand's (1998) Feelings of Relatedness Scale - Situational Motivation Scale (SIMS; Guay, Vallerand, & Blanchard, 2000) - 16-item, Athlete Engagement Questionnaire (Lonsdale, Hodge, & Jackson, 2007).  Data Analysis: -Descriptive statistics and bivariate	Need-satisfaction is an important antecedent of engagement among youth athletes. Results demonstrate the importance of need satisfaction in the promotion of autonomous motivation. External regulation and amotivation were both negatively related with athlete engagement. Skiing environments that focus on athletes' intrinsic and internalised reasons for sport involvement (e.g. personal mastery, skill improvement, and the joy of competition) may be invaluable in enhancing athlete perceptions of vigour, dedication, and enthusiasm towards their sport involvement.



No.	Title	Authors	Date, and type, of publication	Research design and approach	Aims and objectives	Participants (sample size and description)	Data analysis techniques	Summarised findings and conclusions.
							<ul style="list-style-type: none"> <li>correlations.</li> <li>-Mediation analyses.</li> <li>-Non-parametric bootstrapping analyses by Preacher and Hayes (2008).</li> </ul>	
13.	Playing the edge: Motivation and risk taking in a high-altitude wilderness like environment.	Ewert, A. W.	1994 Journal Article	Quantitative approach.	The purpose of this study is to identify the motivational patterns of one group of mountain climbers and determine if these patterns changed as a function of experience in the activity.	360 high-altitude mountaineers	<p>Measures:</p> <ul style="list-style-type: none"> <li>-Self-developed 50-item questionnaire</li> <li>-Experience and skill index</li> </ul> <p>Analysis:</p> <ul style="list-style-type: none"> <li>Principal components factor analysis with varimax rotation.</li> </ul>	<ul style="list-style-type: none"> <li>-Exhilaration and excitement appear to be the important components for the high-altitude mountaineer.</li> <li>-The motivations for participation depend on a level of experience of the individual.</li> <li>-Personality driven motivations such as risk taking did not achieve a high level of importance.</li> <li>-The pursuit of risk has little to do with the reasons for being there.</li> <li>-In sum it would appear that high altitude climbers, and especially highly experienced ones are climbing for different reasons than risk or danger.</li> </ul>
14	Quality of experience and risk perception in high-altitude rock-climbing.	Fave, A. D., Bassi, M., & Massimini, F	2003 Journal Article	Quantitative approach – Experience Sampling Method (ESM)	The aim was the investigation of the quality of experience and risk perception associated with high-altitude rock-climbing.	6 highly experienced Italian climbers.	<p>Measures:</p> <ul style="list-style-type: none"> <li>-Experience sampling method (ESM) was used, via on-line repeated self-reports.</li> </ul> <p>Analysis of data:</p> <ul style="list-style-type: none"> <li>-T-tests</li> <li>-Bonferroni approach</li> <li>-Frequency distribution</li> </ul>	<ul style="list-style-type: none"> <li>- Climbing proved to be a potential source of optimal experience. Flow was the experience most frequently associated with the expedition in general and, above all, with camp and climbing activities. One of the essential components of flow is intrinsic motivation - climbers were intrinsically motivated. Expedition and climbing were associated with an autotelic experience, in which climbers received unique rewards intrinsic to the activity.</li> <li>-Risk taking was not a goal per se but a means for climbers to experience flow.</li> <li>-It is a challenging task climbers look for, with a goal directed approach.</li> </ul>
15	Skydiving as emotion regulation: The rise and fall of anxiety is moderated by alexithymia.	Woodman, T., Cazenave, N., & Le Scanff, C.	2008 Journal Article	Quantitative approach.	To explore the emotion regulation function that a high risk activity might serve.	111 reasonably experienced female skydivers	<p>Measures:</p> <ul style="list-style-type: none"> <li>-The Toronto Alexithymia Scale (TAS-20; Bagby, Parker, &amp; Taylor, 1994)</li> <li>-The State-Trait Anxiety Inventory (STAI; Spielberger, 1983)</li> <li>-The Sensation Seeking Scale (SSS-V; Zuckerman, 1979)</li> </ul> <p>Analysis:</p> <ul style="list-style-type: none"> <li>-Descriptive statistics</li> <li>-T-tests</li> <li>-ANOVAs</li> <li>-Greenhouse-Geisser correction factor</li> <li>-Bonferroni-corrected follow up tests</li> <li>-ANCOVA</li> </ul>	Skydiving appears to be an effective emotion regulation mechanism for alexithymic women, as their anxiety drops considerably as a consequence of performing a skydive. These emotional benefits appear to be short-lived and the women might come to depend somewhat on risk-taking activities as a means of regulating their negative affect. The underlying motive for engaging in high-risk sport for non-alexithymic women is not associated with a (conscious or unconscious) desire to experience anxiety fluctuations. Alexithymia is a motive for engaging in a high-risk sport.
16	Why people climb: The relationship of participant motives and experience level to mountaineering.	Ewert, A.	1985 Journal Article	Quantitative approach.	To better understand mountaineers' motivations and the effect of experience.	372 male 78 female mountaineers. 38% were inexperienced climbers and 62% experienced climbers.	<p>Measure:</p> <ul style="list-style-type: none"> <li>-Self-constructed 40 item measuring subjects' reported motivations for climbing mountains.</li> </ul> <p>Analysis:</p> <ul style="list-style-type: none"> <li>-Principal component factor analysis with varimax rotation.</li> <li>-Step wise discriminant analysis</li> <li>-Canonical correlation, Wilks' lambda</li> <li>-Bivariate t-tests</li> </ul>	Experience level can play a role in the motivations of participants towards a specific outdoor experience. For the inexperienced mountain climber, items such as recognition, escape, and social activities appeared to be more important. Items of less external reward orientation such as exhilaration, challenge, personal testing, making decisions and locus of control are more descriptive of the more experienced climber. The concept of motivational change in relation to skill level was introduced.

Final word count [12345]

### **Chapter 3 – Brief Critical Reflection**

As I come to the end of this research study, I am naturally inclined to reflect on this process. Firstly, as I am pondering on what motivated me to choose the specific topic for my study, I become more aware of how the high-risk sport domain is a very personal subject for me. High-risk sport participants have fascinated me for as long as I can remember – their defiance of normality, their tenacity and perseverance has interested me and left me curious. It was not this curiosity, however, that motivated me to choose the topic, but rather my brother's engagement in rock-climbing. From an outsider's perspective, I have always been aware of how his sport has enabled him to overcome many physical and personal obstacles. To me it appeared as if rock-climbing was a lifeline to him, that is, until June 2016 when the line snapped and he fell 15 meters from Paarlberg in the Western Cape whilst climbing. What ensued was a long and tedious recovery process with multiple operations and setbacks. This big event fundamentally inspired me to explore what is known in the scientific literature about high-risk behaviour in an attempt to understand why my brother engaged in such a sport. It was obvious that he benefited immensely from partaking in the sport although it eventually cost him most of his mobility. As a researcher, I wondered what the beneficial possibilities for others may be, as well as the implications for clinical psychology. This study has partially succeeded in elucidating some of these questions, as I have obtained some perspective into the motives and benefits of engagement in high-risk sport.

Another personal aspect worthy of reflection is how sport, and specifically hiking, has helped me to endure trying times throughout the process of my master's degree and internship. I found that I turned to sport in an attempt to alleviate my personal and professional stress. Personally, hiking is a space where I can explore parts of myself and regain perspective. It is a place where meaning-making is integral to the activity, and it

allows me some respite from my own emotions whilst energizing me to face obstacles that are yet to come.

The relevance and value of this study is, however, not only limited to the obvious personal interest and benefits that it may hold for me. As an intern clinical psychologist at my internship site, I am continuously aware of how deficits in self-regulation is pervasive in almost all of the pathologies that I have been treating therapeutically. I have witnessed first-hand how the concurrent impulsive and high-risk behaviour brings a wave of destruction with it. Although the direct treatment of high-risk behaviour is usually not the main goal of therapy, I am aware of how these patients would benefit immensely from therapeutic programmes where treatment would take place within a supportive framework directed at these behaviours, in addition to psychotherapy.

Although this study aimed to be explorative in nature, it did provide some direction for future research so that supportive interventions may be considered, researched, developed and ultimately employed. This study did, however, only provide a plausible theoretical hypothesis as to why the expression of high-risk behaviour may ultimately lead to better regulation thereof, and how the high-risk context aids this. The contribution of this study thus lies within the synthesised exploration that it gives of the current literature in order to provide a basis from which future research can be conducted

Lastly, I would like to comment on the methodology used for this study. Due to the time constraints, a rapid review, rather than a systematic review approach was chosen. The rapid review approach used in this study was initially daunting to me, as I had not previously used this methodology. In order to comfortably find myself within this approach, perusal of the literature on the review process was extremely important. Guidance from my research supervisor also helped me. Eventually, I learnt that a well-written protocol, detail and

documentation are key in this process and I was able to complete my first rapid review successfully.

### **Conclusion**

From inception to completion, the research process has been both challenging and rewarding. I have explored a topic that holds significant personal value for me, with the hope that it will ultimately lay a meaningful foundation for future research in the high-risk domain. I believe that this foundation may aid in the development of interventions aimed at not only developing skills with regards to self-regulation and self-determination, but also where need satisfaction will contribute to increased well-being.

## APPENDIX A: PROOF OF LANGUAGE EDITING

Dear Examiner

This is to certify that I, Ilze Holtzhausen de Beer, language practitioner and manager at the University of South Africa language edited the dissertation "The nature of self-determination and regulatory styles in high-risk sport contexts: a rapid review" by Mariechen Basson (23446234).

The onus is, however, on the student to make the changes suggested and to attend to the queries. Please note that I do not accept responsibility for content errors.

Please direct any queries regarding the editing to me.

Kind regards



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