*South African Journal for Research in Sport, Physical Education and Recreation, 2016, 38(2): 153 - 165.*
*Suid-Afrikaanse Tydskrif vir Navorsing in Sport, Liggaamlike Opvoedkunde en Ontspanning, 2016, 38(2): 153 - 165.*
*ISBN: 0379-9069*

# MINDFULNESS, PSYCHOLOGICAL WELL-BEING AND DOPING IN TALENTED YOUNG HIGH-SC HOOL ATHLETES

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***ABSTRACT***

*The primary aim of this research was to determine how mindfulness and psychological well-being relate to the propensity to use Performance-Enhancing Drugs (PEDs) in a sample of talented young athletes. A secondary aim was to determine how mindfulness and psychological well-being are related. This was a survey study with a quantitative research approach. South African Academy athletes at a high performance centre and competitive high school athletes from four private high schools participated in the survey. In the survey, two validated questionnaires (Five Facet Mindfulness Questionnaire [FFMQ] and Ryff's Psychological Well-being Scale), and a self-constructed questionnaire to establish the propensity of athletes to use PEDs were employed. 346 athletes (208 boys, 138 girls) aged M=16.0, SD=1.4 years participated. There was a significant correlation (r=0.32, p=0.00) between overall mindfulness and psychological well-being as measured by the FFMQ and Ryff's Psychological Well-being Scale respectively. Two possible predictors of propensity to use PEDs were identified by means of logistic regression and cross tabulation. It is concluded that mindfulness and psychological well-being were inversely related to the propensity to use PEDs.*

**Key words:** Anti-doping; Performance-enhancing drugs; Psychological well-being; Mindfulness.

## INTRODUCTION

The fight against doping in sport is extremely complex (European Commission, 1999). Therefore, the World Anti-Doping Agency (WADA) is continually investigating new approaches to combat the use of performance-enhancing drugs (PEDs) in sport. Psychological factors play an important part in sport participation. Besides influencing athletes' success in their sport, it can also influence the way they approach training and competition. An area that is rapidly gaining more attention concerning the important role psychology plays in health and sporting success is the concept of mindfulness.

Various definitions for mindfulness have been proposed. Mindfulness means being consciously aware of the present moment in a non-judgemental way (Kabat-Zinn, 2008). Another description of mindfulness is the observation of the ongoing stream of internal and external stimuli as it presents itself in a non-judgemental way (Baer, 2003), and bringing

awareness to practically any situation (Simon & Wylie, 2004). Wallace (2006) defined mindfulness as the sustained, voluntary attention continuously focused on a familiar object without absent-mindedness or distraction and meta-attention, the ability to check the state of the mind, quickly recognising whether one's attention has succumbed to either arousal or negligence.

Mindfulness has been associated with psychological well-being. Recent research revealed a strong relation between mindfulness and psychological well-being (Brown *et al*., 2007). It is, therefore, meaningful to combine mindfulness and psychological well-being to determine possible psychological factors that relate to the propensity to use PEDs. Mace (2008) maintains that it is because of the distinct characteristic of mindfulness of focussing on a process instead of extraneous factors that it is able to contribute towards psychological well-being. Well-being has generally been conceptualised either as psychological well-being (Ryff, 1989), subjective well-being (Diener, 2000), happiness (Myers, 2000), or quality of life (Frisch, 2006).

Although a fair amount of research on mindfulness has been conducted particularly in the last two decades, limited research has been conducted specifically in relation to sport participation. Recently, a few studies have shown that higher levels of mindfulness can optimise and enhance sport performance (Kee & Wang, 2008; Bernier *et al*., 2009; Wolanin & Schwanhausser, 2010). Due to the nature of mindfulness, athletes who are highly mindful and whose psychological well-being is good, might possibly also be less prone to doping in sport.

According to Deci and Ryan (1980), open awareness may be especially valuable in facilitating the choice of behaviours that are consistent with person's needs, values and interests. The extensive research overview of mindfulness and the benefits of being mindful indicate that mindfulness can be associated with increased capacity to improve the freedom to choose suitable and favourable reactions to situations and behaviour in general (Brown *et al*., 2007). Research on mindfulness reveal that individuals who are higher in dispositional mindfulness make safer choices in life and are more aware of outcomes and of gains and losses (Brown *et al*., 2007).

Gaining insight into the relationship between mindfulness and psychological well-being with the tendency to use PEDs to improve performance can possibly assist in identifying athletes who are more likely to use PEDs. An improved understanding of the psychological constructs related to the use of PED can assist in developing strategies to prevent doping in sport, for example, mindfulness training.

## AIM OF THE STUDY

The first aim of the research was to determine how mindfulness and psychological well-being relate to the propensity to use performance-enhancing drugs (PEDs) in a sample of talented young athletes. A second aim was to determine how mindfulness and psychological well-being are related.

## METHODOLOGY

This was a survey study and a quantitative research approach was used. Ethical clearance for this study was obtained from the Postgraduate and Ethics Committee of the Faculty of Humanities and the athletes from 4 private high schools.

### Measurement tools

The survey consisted of 2 validated questionnaires, namely the *Five Facet Mindfulness Questionnaire* (FFMQ) (Baer *et al*., 2006) and Ryff's *Psychological Well-being Scale* (Ryff, 1989), as well as a self-constructed questionnaire. The latter questionnaire was used to establish the attitudes and knowledge of the athletes concerning PEDs use and their propensity to use PEDs. The questionnaire consisted of 15 questions using a 6-point Likert scale for the responses.

The FFMQ is based on a factor-analytic study of 5 independently developed mindfulness questionnaires. The analysis yielded 5 factors that appear to represent elements of mindfulness as it is currently conceptualised. The 5 factors are observing, describing, acting with awareness, non-judging of inner experiences and non-reactivity to inner experience. The questionnaire consists of 39 statement items, which are rated by using a 1-5 Likert scale ranging from 'never or very rarely' to 'very often or always true'. The FFMQ has been shown to have strong psychometric characteristics, including adequate to good internal consistencies for the 5 facets (Baer *et al*., 2006).

Ryff's (1989) *Standardised Psychological Well-Being Scale* was used as an outcome measure to assess the athletes on the 6 dimensions of psychological well-being: autonomy; personal growth; environmental mastery; purpose in life; positive relations with others; and self-acceptance. It assesses the participants on 18 questions (3-item scale) along a 6-point Likert scale ranging from 1 ('Strongly disagree') to (6 'Strongly agree'), and has been used in various large-scale national and international surveys (Ryff & Keyes, 1995; Edwards & Steyn, 2008; Steyn *et al*., 2015*).*

### Procedures

A pilot study was conducted with 10 academy athletes, after which a few minor adjustments were made to the questionnaires based on the feedback received from them. This was to ensure that the questionnaires were user-friendly and that the athletes understood all the questions. Participants signed an informed consent or assent form (parents or guardians of participants under the age of 18 years signed informed consent forms), giving their approval to participate in the study. Participants were given clear instructions on how to complete the questionnaires and anonymity was ensured in order to allow the participants to answer the questions as openly and honestly as possible.

### Analysis of data

Cronbach's alpha was used as a measure of reliability to assess the internal consistency of the scales of the questionnaires. To determine whether any relationships exist between the various psychological constructs and subscales as measured by the questionnaires, Pearson's Product Moment Correlation Coefficient and Spearman's Rho were calculated. Results from

the 2 methods were similar; therefore, results from the Pearson's Product Moment Correlation Coefficient are reported.

Furthermore, 3 questions from the questionnaire developed by the researchers were used as an indication of the likelihood of a respondent to use PEDs. The 3 statements were:

*I would consider using a prohibited substance or method to improve my performance even if I knew I would not be caught out.*

*I would consider using a prohibited substance or method to improve my sports performance even if I knew I might be caught out.*

*I currently use a prohibited substance or method to improve my sports performance.*

This indicator was then also correlated with the psychological constructs and subscales.

Logistic regression was used to model the propensity to use PEDs indicators, using as predictors those subscales or psychological constructs that had the highest correlations. For the purposes of the logistic regressions, binary variables (agree vs. disagree) were created by dichotomising the averages of each indicator and subscale. Despite the poor performance of the logistic regression models, it enabled the researchers to identify a few subscales with predictive power. Cross tabulations of the dichotomised indicator variables and the selected subscales were consequently constructed and reported with Fisher's exact-test statistics, as well as with the standardised residuals of each cell, to assess the level of interrelation between the indicators and the subscales and to quantify the interactions between them. The statistical analysis was computed using *IBM SPSS Statistics 20*. All statistical tests were conducted using the conventional 5% level of significance. The Landis and Koch reliability classification scale was used to label the strength of reliability for the correlation statistic with adjectives (Landis & Koch, 1977).

## RESULTS

The research sample consisted of 346 participants (208 boys, 138 girls), with a mean age in years of 16.9±1.4. The athletes participated in various sports. Soccer was the highest (28.5%) represented sport of the sample of athletes. More than 32.0% of the participants had been participating in their respective sport for more than 8 years.

Parametric Cronbach's alpha (coefficient of internal consistency) is commonly used as an estimate of the reliability of a psychometric test. The reliabilities of each construct and/or subscales of the questionnaires were determined. In general, the reliabilities as measured by the Cronbach's alpha of the constructs and/or subscales of the questionnaires were acceptable. However, the internal consistency coefficients of the subscales of Ryff's *Psychological Well-being Scale* were questionable as the Cronbach's alphas were below what would be considered acceptable (0.70) (Table 1). The 3-item scales were used for this study instead of the 14-item or 9-item scales due to the survey as a whole becoming too long. This could have influenced the results obtained since the 3-item scales were developed for national telephone surveys and they have lower internal consistency (Ryff & Keyes, 1995).

*Table 1.* **CRONBACH'S ALPHA: CONSTRUCTS AND/OR SUB-SCALES**

| **Questionnaire & Constructs/Sub-scales** | **Cronbach's alpha** |
|---|---|
| *Five-factor Mindfulness Questionnaire* | **0.84** |
| Observing | 0.68 |
| Describing | 0.81 |
| Acting with awareness | 0.83 |
| Non-judging of inner experience | 0.75 |
| Non-reactivity to inner experience | 0.58 |
| *Ryff's Psychological Well-being Scale* | **0.35** |
| Autonomy | 0.43 |
| Positive relations with others | 0.42 |
| Environmental mastery | 0.54 |
| Personal growth | 0.54 |
| Purpose in life | 0.41 |
| Self-acceptance | 0.54 |

There was a weak but significant correlation (r=0.32, p=0.00) between overall mindfulness and psychological well-being as measured by the *FFMQ* and Ryff's *Psychological Well-being Scale*, respectively. Regarding the subscales or psychological constructs of the 2 questionnaires there were numerous weak to fair correlations (Table 2).

Answers to the 3 questions that served as an indicator regarding the propensity of the athlete to use PEDs are presented in Table 3.

The correlations between the indicator (propensity to use PEDs), and the psychological constructs or subscales as determined by the *FFMQ* and Ryff's *Psychological Well-being Scale*, are provided in Table 4.

Although Table 4 also reveals a significant correlation between 'personal growth' and the propensity to use PEDs, only 2 significant predictors of the propensity to use PEDs were identified by means of logistic regression and cross tabulation, namely 'acting with awareness' from the *FFMQ* and 'purpose in life' from Ryff's *Psychological Well-being Scale* (Table 5).

*Table 2.* **CORRELATION BETWEEN PSYCHOLOGICAL CONSTRUCTS AND/OR SUBSCALES OF QUESTIONNAIRE AND SCALE**

| **Five Facet Mindfulness Questionnaire subscales** | **Ryff's Psychological Well-being Scale subscales** r (p-Value) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Autonomy | Positive relations with others | Environmental mastery | Personal growth | Purpose in life | Self-acceptance | Overall psychological well-being |
| Observing | -0.19* (0.00) | 0.13* (0.02) | -0.04 (0.42) | -0.26* (0.00) | 0.12* (0.03) | -0.10* (0.07) | |
| Describing | -0.33* (0.00) | 0.22* (0.00) | -0.31* (0.00) | -0.29* (0.00) | 0.13* (0.01) | -0.27* (0.00) | |
| Acting with awareness | -0.10* (0.00) | 0.29* (0.00) | -0.34* (0.00)* | -0.33* (0.00) | 0.24 (0.00) | -0.37* (0.00) | |
| Non-judging of inner experiences | -0.11* (0.05) | 0.20* (0.00) | -0.24 (0.00) | -0.07 (0.17) | 0.04 (0.44) | -0.27* (0.00) | |
| Non-reactivity to inner experience | -0.29* (0.00) | 0.10 (0.07) | -0.22* (0.00) | -0.29* (0.00) | 0.11 (0.03) | -0.16* (0.00) | |
| Overall mindfulness | | | | | | | 0.32* (0.00) |

r= Pearson's Correlation coefficient * Significance: p<0.05 (2-tailed)

*Table 3.* **PROPENSITY TO USE PERFORMANCE-ENHANCING DRUGS: RESULTS OF INDICATOR QUESTION**

| **Questions and response options** | **Response: Percentage (%)** |
|---|---|
| *Q2: I would consider using a performance-enhancing drug, e.g. anabolic steroids, to improve my sports performance, if I knew I would not be caught out.* | |
| Strongly disagree | 69.9 |
| Moderately disagree | 8.5 |
| Slightly disagree | 6.7 |
| Slightly agree | 6.7 |
| Moderately agree | 1.8 |
| Strongly agree | 6.4 |

*Continued*

*Table 3.* **PROPENSITY TO USE PERFORMANCE-ENHANCING DRUGS: RESULTS OF INDICATOR QUESTION *(continued)***

| **Questions and response options** | **Response: Percentage (%)** | |
|---|---|---|
| *Q3: I would consider using a performance-enhancing drug to improve my sports performance even if I knew there was a chance that I may be caught out.* | | |
| Strongly disagree | 80.1 | |
| Moderately disagree | 6.9 | |
| Slightly disagree | 3.0 | |
| Slightly agree | 5.7 | |
| Moderately agree | 2.7 | |
| Strongly agree | 1.5 | |
| *Q4: I currently use a performance-enhancing drug to improve my sports performance e.g. anabolic steroids.* | | |
| Strongly disagree | 90.9 | |
| Moderately disagree | 2.4 | |
| Slightly disagree | 2.7 | |
| Slightly agree | 3.0 | |
| Moderately agree | 0.0 | |
| Strongly agree | 0.9 | |

*Table 4.* **CORRELATION BETWEEN INDICATOR[#] (PROPENSITY TO USE PEDs) AND PSYCHOLOGICAL CONSTRUCTS AND/OR SUBSCALES OF ATHLETES**

| **Questionnaires and subscales** | **Propensity to use PEDs** Correlation (r) | (p-Value) |
|---|---|---|
| *Five Facet Mindfulness Questionnaire* | | |
| Observing | 0.04 | 0.52 |
| Describing | -0.06 | 0.29 |
| Acting with awareness | **-0.19*** | **0.00** |
| Non-judging of inner experiences | -0.04 | 0.41 |
| Non-reactivity to inner experience | 0.06 | 0.27 |
| Overall mindfulness | -0.08 | 0.13 |
| *Ryff's Psychological Well-being Scale* | | |
| Autonomy | 0.01 | 0.81 |
| Positive relations with others | -0.08 | 0.81 |
| Environmental mastery | 0.04 | 0.46 |
| Personal growth | **0.16*** | **0.00** |
| Purpose of life | **-0.20*** | **0.00** |
| Self-acceptance | 0.09 | 0.11 |
| Overall psychological well-being | 0.00 | 0.95 |

r= Pearson's Correlation coefficient * Significance: p<0.05 (2-tailed) [#] Indicator= Propensity to use PEDs

*Table 5.* **CROSS TABULATION: PROPENSITY TO USE PERFORMANCE-ENHANCING DRUGS**

| **Binary mean of 3 items** | | **Subscale: Acting with awareness** Disagree | Agree |
|---|---|---|---|
| Agree | *Count* | 130.0 | 191.0 |
| | *Expected count* | 136.2 | 184.8 |
| | *SRD* | -0.5 | 0.05 |
| Disagree | *Count* | 16.0 | 7.0 |
| | *Expected count* | 9.8 | 13.2 |
| | *SRD* | 2.0* (p=0.08) | -1.7 |
| **Binary mean of 3 items** | | **Subscale: Purpose of life** Disagree | Agree |
| Agree | *Count* | 39.0 | 282.0 |
| | *Expected count* | 44.8 | 276.2 |
| | *SRD* | -0.9 | 0.3 |
| Disagree | *Count* | 9.0 | 14.0 |
| | *Expected count* | 3.2 | 19.8 |
| | *SRD* | 3.2* (p=0.02) | -1.3 |

*SRD= Standard Residual Deviation*

## DISCUSSION

Mindfulness concerns being consciously aware of the present moment in a non-judgemental way. Mindfulness is a way to get oneself unstuck from the future and the past and to become solely aware of the present moment (Kabat-Zinn, 2008). The current study revealed a weak but significant correlation ($r=0.32$, $p<0.01$) between overall mindfulness and psychological well-being as measured by the *FFMQ* and Ryff's *Psychological Well-being Scale* respectively. The correlation between mindfulness and psychological well-being was expected since previous research has shown a link between the two. According to Brown and Ryan (2003), by adding clarity and vividness to experience, mindfulness might contribute to well-being and happiness in a direct way. Kabat-Zinn (1990) found that the enhancement of mindfulness through training facilitates a variety of well-being outcomes. In addition, mindfulness might be important in disengaging individuals from automatic thoughts, habits and unhealthy behaviour patterns and could, therefore, play a key role in fostering informed and self-endorsed behavioural regulation, which has long been associated with well-being (Ryan & Deci, 2000).

The question that arises from the relationship between mindfulness and PEDs, is the possibility that mindfulness training and interventions might assist in counteracting the use of PEDs. Recent research on substance abuse among young adult's reveal promising results, but at this stage, no research data are available on mindfulness training and interventions on athletes and PEDs (Himelstein, 2011). Regarding the subscales or psychological constructs of the two questionnaires, there were numerous correlations, although they were not robust

(Table 1). The highest significant correlation ($r=0.37$, $p<0.01$) was between 'acting with awareness' (*FFMQ*) and 'self-acceptance' (*Psychological Well-being Scale*). Self-acceptance, according to Ryff and Keyes (1995), is a fundamental feature of psychological well-being and a prerequisite for optimal functioning, improved satisfaction with life and confidence that can lead to greater achievement and acceptance of life as it is.

It is important to bear in mind that the internal consistencies of the subscales of Ryff's *Psychological Well-being Scale* were questionable as the Cronbach's alphas were below what would be considered acceptable (0.70). The three-item scales were used for this study instead of the 14-item or 9-item scales because the survey as a whole became too long. This could have influenced the results obtained since the three-item scales were developed for national telephone surveys and they have a lower internal consistency (Ryff & Keyes, 1995). Therefore, the results from this questionnaire should be interpreted with caution and could be a reason why a higher correlation between the two questionnaires was not found. Recent research on PEDs indicated that direct measurement of PEDs use and related constructs might be affected by response biases and particularly social desirability that might influence the validity of the results (Brand *et al.*, 2011). It is interesting to note that research in this field has also explored the indirect measurement of PEDs (Brand *et al*., 2011; Huybers & Mazanov, 2012).

The primary aim, however, of this research was to determine if mindfulness, psychological well-being and their respective subscales could be linked to the propensity of athletes to use PEDs. It could thus assist in identifying which athletes are more likely to use PEDs and as such the appropriate interventions could be implemented as a preventative measure.

Only two possible predictors were determined using the process of logistic regression and cross tabulation. The predictors included 'acting with awareness' (subscale from the *FFMQ*) and 'purpose of life' (subscale from the *Psychological Well-being Scale*) (Table 4). Thus, it may be possible that athletes who have less awareness (as it relates to mindfulness), and who lack a clearly defined purpose in life (as it relates to psychological well-being), are more likely to use PEDs.

'Acting with awareness' is one of the five factors that has been identified to represent mindfulness. The other factors are observing, describing, non-judging of inner experiences and non-reactivity to inner experience (Baer *et al*., 2006). Results from this study indicate that only 'acting with awareness' had predictive value. Thus, it may be possible that athletes, who tend to be more aware, will be less likely to use PEDs. Awareness is the background 'radar' of consciousness, continually monitoring the inner and outer environment. One may be aware of stimuli without them being at the centre of attention (Westen, 1998). Most individuals have the capacity to attend and be aware. The researchers, nonetheless, assume that individuals differ in their propensity or willingness to be aware and to sustain attention to what is occurring in the present, and that this mindful capacity varies within persons, because it can be sharpened or dulled by a variety of factors (Brown & Ryan, 2003).

According to Deci and Ryan (1980), open awareness may be especially valuable in facilitating the choice of behaviours that are consistent with one's needs, values and interests (Deci & Ryan, 1980). Therefore, athletes who are more aware may choose not to use PEDs

since they are inconsistent with their values and beliefs. This is in line with the *Disconnected Values Model* (DVM), which has been proposed to decrease doping in sport. It is based on the premise that people are more likely to change their behaviour when they acknowledge the incongruence between their actions (negative habits), and their deepest values and beliefs. The primary purpose of the model is to assist athletes in acknowledging that taking drugs, whether for performance-enhancing or recreational purposes, is a negative habit that might have benefits, but also dire costs and long-term consequences (Murphy, 2005). Studies have shown in the business environment that the DVM provides an effective cognitive-behavioural approach to replace negative habits with positive routines that lead to good health and good job performance (Anshel & Kang, 2007).

If athletes who are less aware are more likely to use PEDs, it might be possible that improving awareness through mindfulness training may be beneficial for these athletes. Most of the research findings indicate that mindfulness could be developed and cultivated (Kabat-Zinn, 1990). Thus, it might be a plausible preventive measure or intervention to decrease doping in sport. Mindfulness-based interventions have multiple components, including mindfulness-practice exercises, didactic instruction and social support (Bishop, 2002). To date, most research on the effects of mindfulness on stress, mood and other indicators of mental health and well-being has been conducted within the context of treatment interventions including *Mindfulness-based Stress Reduction* (MBSR), and *Mindfulness-based Cognitive Therapy* (MBCT) (Kabat-Zinn, 1990; Segal *et al*., 2002). The primary aim of these interventions is to cultivate mindful presence, to facilitate stress reduction and enhance well-being. Controlled and uncontrolled trials with MBSR, MBCT and other mindfulness-based and mindfulness-integrated interventions have demonstrated success in producing these and other effects over both short- and long-term follow-up periods (Baer, 2003; Grossman *et al.*, 2004).

Mindfulness training and research in a sport setting have steadily increased in the last decade, particularly regarding performance enhancement (Gardner & Moore, 2007). Research by Bernier *et al*. (2009) found that sport performance could be enhanced through a programme based on mindfulness and acceptance. The essence of mindfulness can be captured in the notion of having a present-moment focus. According to Jackson and Csikszentmihalyi (1999) and Ravizza (2002), such a present-moment focus is the essence of peak performance in sport. Therefore, mindfulness training might serve a dual purpose in terms of improving sport performance, as well as decreasing the likelihood of doping.

Regarding the second predictor identified in this study, 'purpose in life' is a central characteristic of psychological well-being, because purpose creates meaning in life. This also relates to Frankl's existential theory, which states that people are motivated and driven mainly by searching for meaning and purpose in life (Shantall, 2003). The question arises: if athletes who do not have a clearly defined purpose in life are more prone to using PEDs, can psychological well-being also be improved with specific training? A study by Edwards and Steyn (2008) found that psychological skills and psychological well-being were inter-related concepts with overlapping components. Therefore, psychological skills training (PST) could possibly play a role in positively influencing this aspect of psychological well-being and consequently decrease the likelihood of an athlete doping.

PST programmes refer to interventions, typically in health and sporting contexts, wherein systematic training of various psychological skills takes place. PST programmes usually adopt an overlapping theoretical and practical approach to the discussion and teaching of skills. They can be applied to a single sport in depth, used at different levels of competition, and the same programme can be adapted and implemented in a variety of life and sport contexts (Wann & Church, 1998). In a study conducted on PST, the results indicate general improvement in psychological skills, psychological well-being and sporting performance (Edwards & Steyn, 2008).

Various limitations of this study should be noted. As mentioned previously, the internal consistencies of the subscales of Ryff's *Psychological Well-being Scale* were questionable and might have influenced the results. Therefore, it is strongly recommended that the 9-item and 14-item scale be used in future studies. A possible reason for identifying only two predictors was that although the athletes were assured that their responses would remain anonymous, they might have not answered the questionnaires completely honestly, specifically the self-constructed questionnaire to determine propensity to use PEDs. Only 3.9% of the athletes in this survey admitted to currently using PEDs. Between 10 and 14% of the athletes indicated that they would consider taking PEDs, depending on what the chances were of being caught out.

## PRACTICAL APPLICATION AND CONCLUSION

The results of this study were unexpected regarding the strength of the correlations and the fact that only two possible predictors of PEDs use were identified. However, it appears possible that athletes that are highly mindful and enjoy a sound psychological well-being have a lower inclination to use PEDs. In addition, athletes' awareness and purpose of life could possibly act as predictors with regard to the probability to use PEDs. Mindfulness and psychological skills training might be appropriate interventions for athletes to decrease the likelihood of them using PEDs, as well as to improve their sport performance. Future research specifically regarding mindfulness and psychological skills training within the domain of athlete performance and doping in sport is recommended.

### Acknowledgement

The authors wish to thank the World Anti-Doping Agency (WADA) for funding this research.

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*(Subject Editor: Dr Heinrich Grobbelaar)*