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# Research report on South African university mental skills norms for six sports

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## Abstract

The Bull's Mental Skills Questionnaire, developed in the United Kingdom, is being more extensively used across various South African sport and exercise settings. It comprises seven mental skill subscales: imagery, mental preparation (goal-setting), self-confidence, anxiety and worry management, concentration, relaxation and motivation. Individual subscale scores are calculated and combined into a total score. Previous research has recommended establishment of local sport code norms. The aim of this study was to establish preliminary South African university norms for rugby, cricket, soccer, athletics, hockey and netball. The sample consisted of 121 university students from a South African institution. Norms are presented in means and standard deviations. Sports code norms are compared. Norms are compared with previous studies using similar samples. Recommendations for future research with the scale are made.

**Keywords:** Bull's Mental Skills Questionnaire, South Africa, university students, sport code norms, six sports.

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## Introduction

Mental skills are naturally occurring interrelated yet distinguishable, abilities and/or techniques (Weinberg & Gould, 2010). They are evaluated individually and/or collectively, using singular or combined, quantitative and/or qualitative measures. Many measures are initially constructed and normed in countries with well developed Health and Sport Psychology professions such as the United States of America, United Kingdom, Europe and Australia. These measures are subsequently standardized and normed in other countries and contexts. For example, although mental skills are used in South African (SA) academic, professional and applied fields, such as Sport and Exercise Psychology, to evaluate areas such as health and performance, contextual, sport code specific norms are typically needed for such measures.

Few questionnaires are as comprehensively composed as Bull's Mental Skills Questionnaire (Bull, Albinson & Shambrook, 1996), which was developed in the United Kingdom (UK). Preliminary United Kingdom and South African norms for university students have been developed and recommendations made for the establishment of mental skills norms for sport specific codes (Buscombe, Edwards & Steyn, 2011; Edwards, Buscombe, Steyn, Edwards & Denyer, 2012; Edwards & Edwards, 2012a; Edwards & Steyn, 2011; Edwards, Steyn & Buscombe, 2011; Edwards, Steyn, Buscombe, Edwards & Denyer, 2013).

In this context, normalization refers to the administration of a scale, with the relatively humble aim of establishing basic normative data in the form of means and standardization for a new sample from another population. This enables local users to have some local criteria of practical value against which to judge local respondent's individual and group scale scores, rather than simply comparing such scores against normative data derived from another population group, in this case a university sample or other sporting codes.

The aim of this research was to use the Bull's Mental Skills Questionnaire to develop preliminary South African university norms, in the form of means and standard deviations, for the sport codes of rugby, cricket, hockey, athletics, netball and soccer. The goal was to establish local criteria of practical value in sport and exercise psychology.

## Methodology

### *Sample*

The sample consisted of 121 undergraduate university students, 80 males and 41 females, with an age range of 18 to 25 (mean = 19.07; standard deviation = 1.33). The sample consisted of 35 rugby players, 15 cricketers, 17 athletes, 18 netball players, 15 soccer players and 21 hockey players. This convenient sample was chosen on the basis of accessibility and playing these six sports.

### *Design*

This positivistic design and quantitative methodology, imply data analysis with correlational and descriptive statistical techniques.

### *Instrument*

Bull's Mental Skills Questionnaire measures: imagery, mental preparation (goal-setting), self-confidence, anxiety and worry management, concentration, relaxation and motivation, resulting in individual subscale scores and a total scale score (Bull et al., 1996; Snauwaert, 2001). The questionnaire has 28 items

and assesses participants along a six point Likert scale, requiring item responses ranging from 'strongly agree' to 'strongly disagree'. The scale was based on Nelson and Hardy's (1990) Sport-Related Skill Questionnaire (SPSQ). The SPSQ consists of the following categories: imagery skill, mental preparation, self-efficacy, cognitive anxiety, concentration skill, relaxation skill and motivation. The SPSQ was initially completed by 100 participants with selected statements from all of the seven subscales having a Cronbach alpha level above 0.78. The Bull's Mental Skills Questionnaire has been translated into Dutch, where it was assessed with 219 athletes and shown to have generally high Cronbach alpha levels of 0.80, 0.64, 0.62, 0.61, 0.59, 0.72 and 0.72 respectively for the seven subscales (Snauwaert, 2001).

Standardization of the Bull's scale was undertaken with a total SA and UK sample consisting of 420 undergraduate university participants, with an age range from 18 to 47 years and a mean age of 20.81 ± 4.12. There were 240 males and 180 females. The SA sample mean age and standard deviation was 19.48 and 1.87 years, while the UK sample's mean age and standard deviation was 22.17 and 5.20 years. In the SA sample there were 87 males and 124 females, whereas in the UK sample there were 153 males and 56 females. Principal Component Factor Analysis for the total sample indicated seven components accounting for 60.26% of the variance, for the SA sample indicated eight components accounting for 64.65% of the variance and for the UK sample indicated seven components accounting for 61.83% of the variance. The factor structure of the total international sample exactly reflected the Bull's subscales of anxiety and worry management (factor1), concentration (factor 2), mental preparation (factor 3), arousal regulation (factor 4), motivation (factor 5), imagery ability (factor 6) and self-confidence (factor 7). Full scale, 28 item reliability analyses yielded very satisfactory Cronbach alpha coefficients of 0.88 for the total sample of 420 participants, 0.89 for the SA sample and 0.88 for the UK sample. Respective subscale SA, UK and combined means and standard deviations (in parenthesis) were as follows: imagery ability 18.73 (3.49), 18.57 (3.36) and 18.65 (3.42); mental preparation 18.04 (3.46), 17.31 (3.75) and 17.67 (3.62); self-confidence 17.23 (3.96), 16.38 (3.75) and 16.81 (3.87); anxiety and worry management 18.42 (4.25), 15.78 (5.05) and 17.10 (4.84); concentration ability 15.69 (4.90), 18.23 (4.58) and 16.95 (4.91); relaxation ability 16.03 (4.42), 15.58 (2.89) and 15.81 (3.74); and motivation 19.12 (3.27), 19.46 (3.33) and 19.29 (3.30). Multivariate analysis for the different university samples revealed significant differences for mental preparation, $F = 4.38$, $p < .037$, $\eta^2 = .010$, self confidence, $F = 5.15$, $p < .024$, $\eta^2 = .012$, concentration, $F = 30.14$, $p < .000$, $\eta^2 = .067$, and anxiety and worry management $F = 33.79$, $p < .000$ $\eta^2 = .075$. In each case the direction of these differences can be noted above, with the SA sample scoring higher for mental preparation, self-confidence, and anxiety and worry management, and the UK sample scoring higher for concentration. However, effect sizes are small in all comparisons. Multivariate analysis for age and sex,

revealed very few significant findings, with small effect sizes for all comparisons except for older students scoring significantly higher for anxiety and worry management than younger students, $F = 1.79$, $p < .013$, $\eta^2 = .098$. Women scored significantly higher than men for mental preparation, $F = 4.12$, $p < .043$, $\eta^2 = .010$, while men scored significantly higher for motivation $F = 10.64$, $p < .001$, $\eta^2 = .025$.

*Ethical procedures*

University ethical clearance was acquired. Consent was obtained from the author of the questionnaire to undertake research and establish preliminary norms for the scale. Informed consent, with guaranteed confidentiality and free to withdraw at any stage was obtained from the participants. Data were confidentially and securely stored.

*Data analysis*

The quantitative data were analyzed using the computer based Statistical Package for the Social Sciences (SPSS) with correlational and descriptive statistics computed.

## Results and Discussion

In the following tables, the Bull's Mental Skills Questionnaire subscales are coded as follows: imagery ability (ia), mental preparation (mp), self-confidence (sc), anxiety and worry management (awm), concentration ability (ca), relaxation ability (ra) and motivation (m).

**Table 1**: Correlation Matrix of Bull's Mental Skills Questionnaire subscales for six sports – Pearson's correlation (N=121)

| | IA | MP | SC | AWM | CA | RA | M |
|---|---|---|---|---|---|---|---|
| IA | | | | | | | |
| MP | . 46** | | | | | | |
| SC | .47** | .27** | | | | | |
| AWM | .31** | .15 | .51** | | | | |
| CA | .25** | .06 | .66** | .42** | | | |
| RA | .34** | .26** | .53** | .40** | .36** | | |
| M | .41** | .38** | .44** | .28** | .23** | .58** | |

* p<.05, ** p<.01

Table 1 refers to the correlation between Bull's Mental Skills Questionnaire subscales based upon the university sample. Significant positive correlations at the 1% alpha level were found between imagery ability and mental preparation (0.46), self-confidence (0.47), anxiety and worry management (0.31), concentration ability (0.25), relaxation ability (0.34) and motivation (0.25);

between mental preparation and self-confidence (0.27), relaxation ability (0.26) and motivation (0.38); between self-confidence and anxiety and worry management (0.51), concentration ability (0.66), relaxation ability (0.53) and motivation (0.44); between anxiety and worry management and concentration ability (0.42), relaxation ability (0.40) and motivation (0.28); between concentration ability and relaxation ability (0.36) and motivation (0.23); and between relaxation ability and motivation (0.58). Reliability analysis of all subscales yielded a satisfactory, moderate, Cronbach alpha coefficient of 0.79.

**Table 2**: Bull's Mental Skills Questionnaire total means (N=121)

| Study | Number of participants | Mean/ SD | IA | MP | SC | AWM | CA | RA | M | Total Score |
|---|---|---|---|---|---|---|---|---|---|---|
| Kruger et al. (2013) | 121 | Mean | 18.25 | 19.74 | 17.29 | 14.70 | 16.06 | 15.98 | 19.81 | 121.83 |
| | | SD | 3.11 | 3.06 | 3.92 | 4.42 | 5.86 | 4.07 | 3.53 | 19.09 |
| Edwards and Steyn (2011) | 419 | Mean | 18.48 | 18.61 | 17.47 | 15.38 | 17.88 | 16.17 | 19.07 | 123.09 |
| | | SD | 3.44 | 3.54 | 4.05 | 4.91 | 4.37 | 3.57 | 3.49 | 18.27 |

Table 2 refers to means and standard deviations for the Bull's Mental Skills Questionnaire subscales for the 121 participants. Total score was as follows: imagery ability 18.25 (3.11), mental preparation 19.74 (3.06), self-confidence 17.29 (3.92), anxiety and worry management 14.70 (4.42), concentration ability 16.06 (5.86), relaxation ability 15.98 (4.07), motivation 19.81 (3.53) and total score 121.83 (19.09). Analysis of variance indicated no significant differences between males and females on any of the subscales. The norms for the Kruger, Edwards and Edwards (2013) study were lower than the Edwards and Steyn (2011) study on all subscales and total score, except for mental preparation and motivation. The results show similar trends to the Edwards and Steyn (2011) study, with anxiety and worry management, and relaxation ability being lower in comparison to the rest of the subscales.

Table 3 refers to the sport code means and standard deviations for the Bull's Mental Skills Questionnaire subscales for the 121 participants. Respective means and standard deviations (in parentheses) for rugby were as follows: imagery ability 18.11 (2.76), mental preparation 19.40 (2.51), self-confidence 17.43 (3.59), anxiety and worry management 14.57 (4.29), concentration ability 17.06 (5.38), relaxation ability 16.63 (3.96), motivation 19.86 (3.05) and total score 123.06 (17.77). The university students' norms were higher than high school rugby players, in grade 11 and 12, from the Edwards and Edwards (2012a) study on imagery ability, mental preparation, self-confidence, motivation and total score.

**Table 3:** Bull's Mental Skills Questionnaire subscale means for six sports (N=121)

| Sports | Mean/ SD | IA | MP | SC | AWM | CA | RA | M | Total Score |
|---|---|---|---|---|---|---|---|---|---|
| Rugby | Mean | 18.11 | 19.40 | 17.43 | 14.57 | 17.06 | 16.63 | 19.86 | 123.06 |
| | SD | 2.76 | 2.51 | 3.59 | 4.29 | 5.38 | 3.96 | 3.05 | 17.77 |
| Cricket | Mean | 18.13 | 19.80 | 18.47 | 15.47 | 16.93 | 16.00 | 20.33 | 125.13 |
| | SD | 3.18 | 3.17 | 3.38 | 4.03 | 5.86 | 4.34 | 2.87 | 19.66 |
| Hockey | Mean | 17.43 | 19.62 | 15.86 | 13.86 | 13.00 | 14.38 | 19.05 | 113.19 |
| | SD | 2.93 | 3.11 | 2.97 | 3.72 | 5.60 | 3.57 | 4.12 | 15.72 |
| Netball | Mean | 18.11 | 20.33 | 17.44 | 14.89 | 17.28 | 15.94 | 20.17 | 124.17 |
| | SD | 3.07 | 2.28 | 3.96 | 5.31 | 6.05 | 3.64 | 3.43 | 17.57 |
| Soccer | Mean | 20.73 | 21.20 | 19.00 | 16.00 | 17.27 | 17.13 | 21.47 | 132.80 |
| | SD | 2.94 | 2.21 | 5.04 | 4.63 | 6.39 | 4.69 | 2.36 | 16.31 |
| Athletics | Mean | 17.59 | 18.65 | 16.06 | 14.00 | 14.65 | 15.59 | 18.35 | 114.88 |
| | SD | 3.48 | 4.70 | 4.44 | 4.87 | 5.62 | 4.43 | 4.66 | 23.94 |

The lower scores on anxiety and worry management, concentration and relaxation ability could be due to increased academic workload at university. Cricket norms were as follows: imagery ability 18.13 (3.18), mental preparation 19.80 (3.17), self-confidence 18.47 (3.38), anxiety and worry management 15.47 (4.03), concentration ability 16.93 (5.86), relaxation ability 16.00 (4.34), motivation 20.33 (2.87) and total score 125.13 (19.66). Hockey: imagery ability 17.43 (2.93), mental preparation 19.62 (3.11), self-confidence 15.86 (2.97), anxiety and worry management 13.86 (3.72), concentration ability 13.00 (5.60), relaxation ability 14.38 (3.57), motivation 19.05 (4.12) and total score 113.19 (15.72). Netball: imagery ability 18.11 (3.07), mental preparation 20.33 (2.28), self-confidence 17.44 (3.96), anxiety and worry management 14.89 (5.31), concentration ability 17.28 (6.05), relaxation ability 15.94 (3.64), motivation 20.17 (3.43) and total score 124.17 (17.57). Soccer: imagery ability 20.73 (2.94), mental preparation 21.20 (2.21), self-confidence 19.00 (5.04), anxiety and worry management 16.00 (4.63), concentration ability 17.27 (6.39), relaxation ability 17.13 (4.69), motivation 21.47 (2.36) and total score 132.80 (16.31). Athletics: imagery ability 17.59 (3.48), mental preparation 18.65 (4.70), self-confidence 16.06 (4.44), anxiety and worry management 14.00 (4.87), concentration ability 14.65 (5.62), relaxation ability 15.59 (4.43), motivation 18.35 (4.66) and total score 114.88 (23.94). Results indicated soccer players had the highest total mental skills, followed by cricket, netball, rugby, athletics and hockey. Soccer players' mean scores were higher than all other sports except for concentration ability where netball was slightly higher.

The present findings support and extend previous research with the scale in the South African context (Buscombe et al., 2011; Danariah, 2007; Edwards, 2007; Edwards & Edwards 2007; 2012a; 2012b; Edwards & Steyn, 2008; 2011; Edwards et al., 2011; 2012; 2013).

## Conclusion

This research provided initial South African university norms for six sports in the form of means and standard deviations for the Bull's Mental Skills Questionnaire using a sample of 121 university students. Soccer players had the highest mental skills score. Norms are compared with previous studies using similar university samples. Although very small sample sizes were used, findings provide an initial basis for sport code comparisons to be made. Further South African sporting code norms with larger samples will add value to the development and usage of Bull's Mental Skills Questionnaire.

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## References

Bull, S., Albinson, J. & Shambrook, C. (1996). *The Mental Game Plan. Getting Psyched for Sport*. Eastbourne, East Sussex: Sports Dynamics.

Buscombe, R.M., Edwards, D.J. & Steyn, B.J.M. (2011, July). *Use of and Relationships between Mental Skills in South African and United Kingdom University Students*. Poster presented at the 16th Annual Congress of the European College of Sport Science, Liverpool, United Kingdom.

Danariah, D. (2007). *Promoting Community Mental Health through Team Sport in Zululand.* Doctoral Dissertation. KwaDlangezwa: University of Zululand.

Edwards, D.J. (2007). *Sport Psychological Skills Training and Psychological Well-Being in Youth Athletes.* Doctoral Dissertation. Pretoria: University of Pretoria.

Edwards, D.J. & Edwards, S.D. (2012a). Mental skills of South African male high school rugby players. *African Journal for Physical, Health Education, Recreation and Dance,* 18(1), 152-157.

Edwards, D.J. & Edwards, S.D. (2012b). The evaluation of a psychological skills training programme for rugby players. *African Journal for Physical, Health Education, Recreation and Dance,* 18(3), 525-534.

Edwards, S.D. & Edwards, D.J. (2007). The description and evaluation of a breath-based psychological skills training programme for health and sport. *African Journal for Physical, Health Education, Recreation and Dance*, 13(4), 380-399.

Edwards, D.J., Buscombe, R.M., Steyn, B.J.M., Edwards, S.D. & Denyer, P. (2012). *Mental Skills in South African and United Kingdom University Students: Reliability Analysis of Bull's Mental Skills Questionnaire*. Poster presented at the 30th International Conference of Psychology, Cape Town, South Africa.

Edwards, D.J., Steyn, B.J.M. & Buscombe, R.M. (2011, July). *Mental skills in South African Undergraduate University Students: An Exploratory Stud*y. Poster presented at the 13th European Congress of Sport Psychology, Madeira, Portugal.

Edwards, D.J. & Steyn, B.J.M. (2008). Sport psychological skills training and psychological well-being. *South African Journal for Research in Sport, Physical Education and Recreation*, 30(1), 15-28.

Edwards, D.J. & Steyn, B.J.M. (2011). The establishment of norms for the Bull's mental skills questionnaire in South African university students: An exploratory study. *African Journal for Physical, Health Education, Recreation and Dance*, 17(3), 526-534.

Edwards, D.J., Steyn, B.J.M., Buscombe, R.M., Edwards, S.D. & Denyer, P. (2013). Standardization of a mental skills scale in South Africa and United Kingdom. Unpublished paper.

Nelson, D. & Hardy, L. (1990). The development of an empirically validated tool for measuring psychological skill in sport. *Journal of Sport Science*, 8(10), 71.

Snauwaert, E. (2001). *A Psychometric Evaluation of Bull's Mental Skills Questionnaire: A Study on Flemish Athletes*. Presented at the 10th World Congress of Sport Psychology, Skiathos, Greece.

Weinberg, R.S. & Gould, D. (2010). *Foundations of Sport and Exercise Psychology* (5th ed.). Champaign, IL: Human Kinetics.