
Citation:

Kubayi, A and Toriola, A and Didymus, F (2018) Development and initial validation of an instrument to assess stressors among South African sports coaches. J Sports Sci, 36 (12). pp. 1378-1384. ISSN 1466-447X DOI: <https://doi.org/10.1080/02640414.2017.1385264>

Link to Leeds Beckett Repository record:

<https://eprints.leedsbeckett.ac.uk/id/eprint/6407/>

Document Version:

Article (Accepted Version)

This is an Accepted Manuscript of an article published by Taylor & Francis in Journal of Sports Sciences on 3 Oct 2017, available online: <http://www.tandfonline.com/10.1080/02640414.2017.1385264>

The aim of the Leeds Beckett Repository is to provide open access to our research, as required by funder policies and permitted by publishers and copyright law.

The Leeds Beckett repository holds a wide range of publications, each of which has been checked for copyright and the relevant embargo period has been applied by the Research Services team.

We operate on a standard take-down policy. If you are the author or publisher of an output and you would like it removed from the repository, please [contact us](#) and we will investigate on a case-by-case basis.

Each thesis in the repository has been cleared where necessary by the author for third party copyright. If you would like a thesis to be removed from the repository or believe there is an issue with copyright, please contact us on openaccess@leedsbeckett.ac.uk and we will investigate on a case-by-case basis.

Development and Initial Validation of an Instrument to Assess Stressors Among South
African Sports Coaches

Alliance Kubayi^a, Abel Toriola^a and Faye F. Didymus^b

Author Note

^aDepartment of Sport, Rehabilitation and Dental Sciences; Tshwane University of Technology; Pretoria; South Africa. ^bCarnegie Research Institute, Leeds Beckett University, United Kingdom.

Correspondence concerning this article should be addressed to *Alliance Kubayi; Building 3-120; Department of Sport, Rehabilitation and Dental Science; Main Campus; Tshwane University of Technology; Pretoria; South Africa. Telephone: +27(0)12-382-4272. E-mail: KubayiNA@tut.ac.za

Abstract

The aim of this series of studies was to develop and initially validate an instrument to assess stressors among South African sports coaches. In study one, a preliminary pool of 45 items was developed based on existing literature and an expert panel was employed to assess the content validity and applicability of these items. In study two, the 32 items that were retained after study one were analysed using principal component analysis (PCA). The resultant factorial structure comprised four components: environmental stressors, performance stressors, task-related stressors, and athlete stressors. These four components were made up of 26 items and, together, the components and items comprised the provisional *Stressors in Sports Coaching Questionnaire* (SSCQ). The results show that the SSCQ demonstrates acceptable internal consistency (.73–.89). The findings provide preliminary evidence that SSCQ is a valid tool to assess stressors among South African sports coaches.

Keywords: coaching, demands, measurement, psychometric, stress

Development and Initial Validation of an Instrument to Assess Stressors Among South African Sports Coaches

Sports coaching can be an inherently stressful profession. This is because coaches are responsible for more than just coaching the sport (Robbins, Gilbert, & Clifton, 2015). For example, sports coaches contribute to wider societal agendas such as improving health, social inclusion, lifelong learning, and community regeneration, as well as facilitating athletes' personal and social development (Fletcher & Scott, 2010). Sports coaches are also required to fulfil a variety of duties including that of a motivator, administrator, *loco parentis*, mental skills coach, disciplinarian, recruiter, technician, planner, leader, communicator, and organiser (Surujlal & Nguyen, 2009). Given these multiple roles and the knowledge that many coaches' employment contracts are short (Fletcher & Scott, 2010) and jobs are often insecure (Olusoga, Butt, Hays, & Maynard, 2009), coaches may encounter high levels of perceived stress (Kubayi, Coopoo, & Morris-Eyton, 2015). As a result, coaches are at risk of experiencing maladaptive outcomes, including decreased immune system function (cf. Segerstrom & Miller, 2004), increased risk of cardiovascular disease (McEwan, 2009), poor decision making (Jones, Tanigawa, & Weisse, 2003), and reduced performance (Surujlal & Nguyen, 2009; Thelwell, Weston, Greenlees, & Hutchings, 2008). Coaches must, therefore, make substantial investments of resources and time to cope with the demanding nature of their role and search for a competitive edge.

In this study, stress was conceptualised as “an ongoing process that involves individuals transacting with their environments, making appraisals of the situations they find themselves in, and endeavouring to cope with any issues that may arise” (Fletcher, Hanton, & Mellalieu, 2006, p. 329) and stressors were defined as “environmental demands (i.e., stimuli) encountered by an individual” (Fletcher et al., 2006, p. 329). Numerous studies have been conducted to identify the stressors that can be experienced by sports coaches (e.g., Didymus,

2017; Olusoga et al., 2009). For example, a range of stressors have been reported by elite coaches in the United Kingdom that relate to athlete concerns, managing the competitive environment, pressure, expectations, coaching responsibilities of the athlete, organisational management, competition preparation, sacrificing personal time, and isolation (Didymus, 2017; Olusoga et al., 2009; Rhind, Fletcher, & Scott, 2013; Thelwell et al., 2008). Factors such as lack of enjoyment, physical hardship, wanting more free time, losing consistently, and interference with family life have also been reported as reasons why coaches may leave their profession (Frey, 2007; Robbins et al., 2015). In two studies of South African coaches, Surujlal and Nguyen (2009) and Kubayi, Coopoo, and Morris-Eyton (2017) indicated that inadequate facilities, inadequate salaries, lack of equipment, lack of support, poor refereeing decisions, unsociable working hours, and job insecurity were stressors experienced by these individuals. These divergent stressors demonstrate that sports coaches work within a complex, ever-changing environment that imposes pressures on them (Fletcher & Scott, 2010).

Given the potentially stressful nature of coaching, the plethora of stressors that coaches encounter, and the maladaptive outcomes that coaches may experience if stress is not effectively managed, it is surprising that research in this area is sparse (Levy, Nicholls, Marchant, & Polman, 2009; Fletcher & Scott, 2010). Indeed, it is only recently that researchers have made discernible efforts to explore stressors among this unique population (Didymus, 2017; Olusoga, Maynard, Hays, & Butt, 2012) and there are many research priorities that are yet to be explored. The published evidence that has explored coaches' experiences of stressors has been concentrated in few countries, including the United Kingdom (Didymus, 2017; Thelwell et al., 2008; Levy et al., 2009; Olusoga et al., 2009), the United States of America (Frey, 2007; Robins et al., 2015), and South Africa (Surujlal & Nguyen, 2009). The majority of these studies have adopted qualitative methods to explore the

stressors encountered by sports coaches (Thelwell, Wagstaff, Rayner, Chapman, & Barker, 2017) and scholars are yet to develop a validated instrument to quantitatively assess this important topic (Arnold & Fletcher, 2012; Arnold, Fletcher, & Daniels, 2013). Thus, quantitative investigations that work toward identifying stressors among sports coaches would add to the current body of literature (Knight, Reade, Selzler, & Rodgers, 2013). One measure to identify stressors among coaches was, however, developed by Surujlal and Nguyen (2009) but contains a number of limitations. First, the questionnaire was adapted from a measure that was designed for soccer referees and, therefore, the items that were included might not be applicable to coaches. Second, Surujlal and Nguyen's (2009) study only included soccer coaches and, thus, the measure may not be applicable to coaches who are working in other sports. Third, rigorous psychometric testing (e.g., principal component analysis; PCA) was not used during the development of the measure. This is a noteworthy limitation of previous literature because psychometrics are important for removing unnecessary items and for grouping remaining items into meaningful components (Anthony, 1999). Therefore, the development of measures to assess stressors would not only advance the research literature in this area, but could also help practitioners to recognise and assess the psychological demands that are experienced by sports coaches (cf. Arnold & Fletcher, 2012).

The study of stressors among sports coaches is essential because findings of such studies can be incorporated into coach education programmes. This is particularly important in countries (e.g., South Africa) where coaches are likely to experience unique demands (e.g., role-related hangovers from the apartheid regime) that are not apparent in more developed countries. Additionally, research addressing this topic is crucial if interventions that help coaches to cope more effectively with stressors are to be developed and tested (Levy et al., 2009). A better understanding of stressors among sports coaches could also assist in identifying coaches who are at risk of experiencing burnout and, therefore, at higher risk of

leaving their profession (cf. Malinauskas, Malinauskiene, & Dumciene, 2010). Despite this knowledge, there remains a need for systematic development of measurement tools to assess stressors among sports coaches that can be subjected to rigorous psychometric assessment (cf. McLean, Mallett, & Newcombe, 2012). In addition, there are currently no valid and reliable tools to examine stressors among coaches who are working in the unique context of coaching in South Africa. As a first step toward developing robust measurement tools for use with coaches more generally, the aim of this multi-study project was to develop and validate a questionnaire for the measurement of stressors among South African sports coaches.

Methods

The studies that are presented in this manuscript were conducted in line with the five steps that were recommended for questionnaire development by Toering, Jordet, and Ripegutis (2013). First, a literature review was conducted; second, a pool of potentially relevant items was generated; third, the initial items were validated; fourth, the items were pilot tested; and finally, PCA was conducted on the provisional questionnaire. These steps were adhered to because they follow those used in other studies in which questionnaires have been developed (Artino, La Rochelle, Degee, & Gehlbach, 2014; DeVellis, 2011).

Step 1: Literature Review

When generating items for a new measurement instrument, it is important to consult available literature (Clark & Watson, 1995). Thus, the first step in developing the questionnaire presented here involved a thorough literature review (Artino et al., 2014). The literature review ensured that the construct definition aligned with relevant previous research, identified extant items that may be adapted for the present study (Gehlbach, Artino, & Durning, 2010), and provided a framework of reference for the item generation process (Toering et al., 2013). During the literature review, previous studies (Didymus, 2017; Frey, 2007; Hanton, Fletcher, & Coughlan, 2005; Knight et al., 2013; Kubayi et al., 2017; Levy et

al., 2009; Olusoga et al., 2009; Rhind et al., 2013; Robins et al., 2015; Surujlal & Nguyen, 2009; Thelwell et al., 2008; Thelwell et al., 2017) on stressors among sports coaches were reviewed and information relevant to the aim of this study (i.e., the different stressors experienced) was extracted and recorded in a Microsoft Excel® document. This master data file initially contained 120 units of data, which were used to generate an initial pool of items.

Step 2: Item Generation

The aim of this step was to sample systematically all information that was extracted during step one and was potentially relevant to the target construct (Clark & Watson, 1995). First, the master Microsoft Excel® data file was reviewed for duplication and overlap independently by the first and second named authors. Regular discussions took place between the two authors to ensure agreement and rigor when sifting the extracted data. Once sifting was complete, 80 units of data that represented distinct stressors remained. All of these 80 items were then reviewed again and those that were too lengthy, lacked relevance for the target population, were too complicated, or too vague were removed (DeVellis, 2011). This process led to a pool of 45 items that represented four subscales: environmental stressors, performance stressors, task-related stressors, and athlete stressors. These subscales align with previous literature on stressors among sports coaches (e.g., Hanton et al., 2005; Frey, 2007; Olusoga et al., 2009). Each item was assigned a five-point Likert-type scale that was anchored at 1 (*not at all a stressor*) and 5 (*highly a stressor*) to facilitate item validation.

Step 3: Item Validation

The degree to which an instrument adequately represents the concept or set of items that it purports to measure is known as content validity (Sekeran, 2003). To ensure content validity during the development of the questionnaire presented here, the preliminary pool of 45 items was sent to an expert panel where each member of the panel had considerable knowledge and experience related to the construct being measured (i.e., stressors among

South African sports coaches). The preliminary questionnaire was sent to two experts who each had a doctorate degree in sports science and had published extensively in the area of sports psychology and coaching within the South African context. The experts were asked to critique the item pool in terms of clarity, ambiguity, and relevance of the items, and were asked to report whether they thought the pool was missing relevant information. Based on the experts' feedback, 10 items were deemed irrelevant and were removed (e.g., "inadequate mental preparation"), three items were modified to enhance clarity (e.g., "conflict between a coach and athletes" was modified to "conflict between me and my athletes"), and no items were added. A total of 35 items were included in the revised item pool, which comprised the provisional *Stressors in Sports Coaching Questionnaire* (SSCQ).

Step 4: Pilot Testing

A pilot test was carried out using the 35-item SSCQ to examine the clarity of the items as well as to explore the feasibility, adequacy, and overall administration of the instrument (Collins, 2003; Czaja & Blair, 1996). A pilot study provides advance warning about where the main research project could fail, where research protocols may not be followed, and or where the proposed methods or instrument are unsuitable (Teijlingen & Hundley, 2002).

Participants. The pilot test was conducted with 20 South African sports coaches (11 females and 9 males) aged 20–41 years old ($M_{\text{age}} = 25.70$, $SD = 6.30$ years). Each of the sports coaches was purposively selected to participate in the pilot study. To meet the selection criteria of the pilot study, the participants had to be coaching priority sports that are recommended by the Department of Sport and Recreation of South Africa (Kubayi et al., 2016). The coaches in the pilot study sample were coaching the following sports: athletics ($n = 1$), cricket ($n = 4$), hockey ($n = 4$), netball ($n = 5$), rugby ($n = 1$), and soccer ($n = 5$). Their coaching experience ranged from 1 to 19 years ($M_{\text{experience}} = 4.95$, $SD = 5.27$ years).

Procedure. Prior to data collection, ethical approval was granted by the Research Ethics Committee of the Tshwane University of Technology and written informed consent was obtained from each of the participants. The participants were informed that their participation was voluntary and that they could withdraw from the study at any point in time and without repercussion. All of the participants completed the provisional SSCQ, which took between five and 10 minutes.

Data analysis and results. Item analysis was carried out on the pilot study data using SPSS® (version 24; IBM Corporation, 2016) to identify and delete any items that reduced the reliability of the subscales (Rhind & Jowett, 2012). For an item to be retained, Tabachnick and Fidell (1996) suggested that at least two of the following three criteria should be met: a minimum item-total correlation coefficient of .40, a range of inter-item correlations between .30 and .70, and an increase in the estimate if an item was deleted. After the initial item analyses, three items that did not meet the inclusion criteria (i.e., they had an item-total correlation coefficient of $<.40$ and inter-item correlations of $<.30$) were removed. Thus, the revised SSCQ consisted of 32 items.

Step 5: Principal Component Analysis

The aim of this step of the questionnaire development was to expose the 32-item provisional SSCQ to rigorous psychometric testing. PCA has been used in previous questionnaire development studies (e.g., Jowett & Ntoumanis, 2004) to reduce items and /or group them into meaningful components. The PCA was chosen based on the rationale that it is psychometrically sound and easier mathematically; it also avoids some of the potential shortcomings associated with ‘factor indeterminacy’ commonly attributed to factor analysis (FA) (Stevens 1996, p. 363). In their comparison of PCA and FA, Tabachnick and Fidell (2007) concluded that: ‘If you are interested in a theoretical solution uncontaminated by unique and error variability ... FA is your choice. If, on the other hand, you simply want an

empirical summary of the data set, PCA is the better choice' (p. 635).

Participants. A total of 119 South African sports coaches (87 males and 32 females) ranging in age from 18 to 64 years ($M_{\text{age}} = 30.36$, $SD = 9.94$ years) participated in this part of the questionnaire development. The participants represented the following sports: cricket ($n = 12$), hockey ($n = 13$), netball ($n = 22$), and rugby ($n = 72$). The coaching experience of the sample ranged from 1 to 40 years ($M_{\text{experience}} = 5.29$, $SD = 6.54$). The same inclusion criteria, procedures, and recruitment methods that were used for the pilot study were adopted for this study.

Data analysis. Prior to performing PCA, missing data were observed. No variable in the provisional SSCQ had >5% of missing data; thus, any data not present were assumed to be missing at random. Bartlett's test of sphericity was significant ($\chi^2 = 2526.26$; $df = 496$; $p < 0.000$) and the Kaiser–Meyer–Olkin (KMO) statistic was .89, which surpassed the acceptable value of .60 (Kaiser, 1974). Thus, the SSCQ correlation matrix was deemed suitable for the PCA. PCA with an oblique oblmin rotation was conducted to assess the structure of the 32-item provisional SSCQ and to explore how well the items represented the underlying latent variables (Mulaik, 2010). For a factor, component, or dimension to be retained it had to exceed the minimum eigenvalue of 1.00 and needed to contain at least three items (Fabrigar, MacCallum, Wegener, & Strahan, 1999). Each item that had a component loading below .50 was deleted from subsequent analyses (Toering et al., 2012) because the sample size for this stage of the questionnaire development was less than 200 (Steven, 2002). Following PCA, Cronbach alpha coefficients were computed to examine the internal consistency of the instrument.

Results

PCA revealed a four-component solution with minimum eigenvalues of 1, which accounted for 60.75% of the total variance. Six items were eliminated from the factor pattern

matrix due to having component loadings of less than .50. Following this stage of the analyses, 26 items were retained. Although two items (interference from management regarding coaching decisions, job insecurity) fell below the benchmark of .50, they were retained because they were reported as important stressors that are experienced by sports coaches within the South African context (see Kubayi et al., 2015; Surujlal & Nguyen, 2009). A further PCA of the four-component structure on the remaining 26 items was conducted and explained 63.07% of the overall variance within the data. Table 1 presents the components, and the eigenvalues, item loadings, and percentage of variance explained by each component. The first component, *environmental stressors*, had an eigenvalue of 10.54 and contains 10 items that accounted for 40.53% of the variance. The second component, *performance stressors*, had an eigenvalue of 2.30 and consists of four items that explained 8.83% of the variance. The third component, *task-related stressors*, had an eigenvalue of 1.96 and includes six items that accounted for 7.55% of the variance. The last component, *athlete stressors*, had an eigenvalue of 1.60 and comprises six items that explained the variance of 6.16%.

Table 1 near here

Relationships Between the Components

Since the present study adopted an oblimin rotation, it was necessary to take into account both the pattern matrix (see Table 1) and the structure matrix (Field, 2005; Graham, Guthrie, & Thompson, 2003). While the former provides information about the component loadings of the variables, the latter presents the correlation between the components and variables (Field, 2005). The results showed a relationship between components one, two, and three, whereas component four was somewhat independent. Although small relationships were present among a few components, it was concluded that the SSCQ would be utilised in its complete four-factor form (Field, 2005).

Reliability

The Cronbach alpha coefficients of the subscales, which assessed the internal consistency of the SSCQ, ranged from .73 to .89. The overall reliability of the questionnaire was .93. All alpha values exceeded the benchmark level of .70 (see Table 2) (Nunnally & Bernstein, 1994).

Table 2 near here

Discussion

The purpose of this study was to develop and to conduct initial validation of an instrument to assess stressors among South African sports coaches. Thus, the study aimed to make a first step toward developing an instrument to measure stressors among sports coaches more generally. The content of the questionnaire was constructed based on a series of procedures that included, amongst others, a thorough literature review, item generation, expert panel validation, item analyses, and PCA. The PCA yielded a four-component solution that incorporated 26 items and formed the SSCQ. These initial analyses suggest that the SSCQ is a sound psychometric measure of stressors among South African sports coaches. Additionally, the internal consistency of the overall scale and subscales each surpassed the acceptable minimum alpha value of .70 (Nunnally & Bernstein, 1994), which demonstrates that the SSCQ is a valid and reliable tool to examine stressors among South African sports coaches.

Although PCA was used to identify underlying or latent components within a group of items, this type of analysis cannot offer an interpretation of the meaning of the identified components (Tabachnick & Fidell, 1996; MacNamara & Collins, 2011). The components are, therefore, interpreted here using published evidence to support their relevance (MacNamara & Collins, 2011). Component one, *environmental stressors*, consists of ten items that encapsulate the organisational stressors that are related to the environment in which a coach operates (Hanton et al., 2005; Rhind et al., 2013). The stressors within this component that

are listed in Table 1 withstood the psychometric testing that was used in this study and reflect the findings of previous studies with sports coaches (see e.g., Didymus, 2017; Frey, 2007; Kubayi et al., 2017; Olusoga et al., 2009; Surujlal & Nguyen, 2009). The findings presented here highlight the significance of environmental stressors for our sample of coaches and suggest that these stressors should be considered carefully by sports organisations (Fletcher & Hanton, 2003). Indeed, sports organisations should identify and manage policies, logistics, and environmental factors that could be perceived as stressors by coaches.

Component two, *performance stressors*, comprises four items that refer to the competitive stressors that pertain directly to competitive performance (Hanton et al., 2005). The stressors that are included in this subscale relate to poor results, financial incentives being dependent on results, pressure to win, and performance being judged on athletes' results. Among the performance stressors, pressure to win is an essential stressor among South African sports coaches (see Surujlal & Nguyen, 2009; Kubayi et al., 2015). Although pressure to win may be self-imposed, researchers have highlighted that such pressure usually stems from club owners and /or managers within the South African context (Kubayi et al., 2015). These findings and those presented in a previous study highlight the need for coaches to work together with athletes (Staff, Didymus, & Backhouse, 2017) and those in management positions to minimise stressors and to cope with those that are unavoidable.

Component three, *task-related stressors*, contains six items that relate to coaching-related tasks (Frey, 2007). This component represents the following stressors: performing multiple roles, managing too many squads, managing other coaches in the programme, lack of recognition for good coaching, interference from management regarding coaching decisions, and making poor decisions. The results of this study provide quantitative support for the stressors that have been reported in qualitative research by Olusoga et al. (2009) and Kubayi et al. (2015). Specifically, the findings of these two studies reported that managing

other coaches within the programme, interference from management, and performing multiple roles (e.g., selector, manager, coach) were cited as stressors among coaches in the United Kingdom and South Africa respectively. This suggests that coaches in these two countries may experience similar stressors and that future research should explore the reliability and validity of the SSCQ among different populations. Component four, *athlete stressors*, consists of six items. This component refers to the behaviour(s) or attitude(s) of athletes that coaches experience as stressors (Olusoga et al., 2009). Given that coaches are likely to spend a substantial amount of time with team members (Hanton et al., 2005), it is understandable that some disagreements or conflict may occur and that these disagreements could be perceived as stressors. Similar results were reported by Olusoga et al. (2009) and Didymus (2017) who found that athletes' behaviour (e.g., lack of commitment and motivation, under-performing in training) were noteworthy stressors among sports coaches.

This study provides an initial validation of the SSCQ using well-established procedures but there are some limitations that should be considered when interpreting the findings. First, the number of expert panel members that we recruited for content validation, as well as the sample sizes for the pilot and main studies, were relatively small. However, it should be noted that the sample sizes are reflective of the South African context where the sports coaching profession is small and still evolving towards professionalisation. Second, the coaches in our samples were unevenly distributed in terms of gender. Therefore, there is a need to conduct further research that includes an equal distribution of male and female coaches. Future studies should also be conducted to compare mean scores of the SSCQ subscales according to various demographic variables, including gender, marital status, age, and level of coaching. Further statistical interrogation of the SSCQ (e.g., test-retest reliability, confirmatory factor analyses) with larger samples of coaches should also be performed to further validate and examine the hypothesised structure of the SSCQ, and to

assess its predictive validity. Since this study assessed the intensity of stressors (i.e., not at all a stressor to highly a stressor) among sports coaches, it is suggested that future studies should use additive scoring methods that relate to other important elements of stressors, including the duration (“how long did this pressure place a demand on you for?”) and frequency of them (“how often did this pressure place a demand on you?”). This is because the addition of these elements could facilitate more comprehensive assessment of the multidimensional psychological demands that coaches experience (Arnold et al., 2013; Arnold & Fletcher, 2012).

Conclusion

The SSCQ appears to be a valid and reliable tool that, with further psychometric testing, could be used to assess stressors among South African sports coaches. Although the SSCQ is currently applicable to coaches within a South African context, it may be adapted to suit coaches who are working in different countries. The SSCQ may be used on an individual basis with a sports coach to assess stressors and can also be used by sports organisations to identify prevalent and endemic stressors that can affect the coaches who are working within their organisations. The questionnaire may also be useful for sport psychology practitioners to develop intervention programmes that may help performers (i.e. sport coaches) to identify the stressors they encounter and assist them to cope with such stressors in effective and sustainable ways (Fletcher & Arnold, 2017; Rumbold, Fletcher, & Daniels, 2012). Such intervention programmes may serve as preventive approaches to stressful encounters in an attempt to modify coaches’ responses to stressors, thereby increasing their self-awareness and enhancing their coping skills resilience to external demands. However, for management of sport organisations who wish to invest in their sport coaches’ well-being and performance, it is likely that their sport will reap sustainable benefits by focusing on all aspects of the organisation’s functioning (Fletcher & Scott, 2010).

References

- Anthony, D. (1999). *Understanding advanced statistics: A guide for nurses and healthcare researchers*. Edinburgh, United Kingdom: Churchill Livingstone.
- Arnold, R., & Fletcher, D. (2012). Psychometric issues in organizational stressor research: A review and implications for sport psychology. *Measurement in Physical Education and Exercise Science*, 16, 81-100. doi:10.1080/1091367X.2012.639608
- Arnold, R., Fletcher, D., & Daniels, K. (2013). Development and validation of the Organizational Stressor Indicator for Sport Performers (OSI-SP). *Journal of Sport and Exercise Psychology*, 35, 180-196. Retrieved from <http://journals.humankinetics.com/JSEP>
- Artino, A. R. Jr., La Rochelle, J. S., Dezee, K. J., & Gehlbach, H. (2014). Developing questionnaires for educational research: AMEE guide no. 87. *Medical Teacher*, 36, 463-474. doi:10.3109/0142159X.2014.889814
- Clark, L. E., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7, 309-319. doi:10.1037/1040-3590.7.3.309.
- Collins, D. (2003). Pretesting survey instruments: An overview of cognitive methods. *Quality of Life Research*, 12, 229-238. Retrieved from <https://jstor.org/journal/qualliferese>
- Czaja, R., & Blair, J. (1996). *Designing surveys: A guide to decisions and procedures*. Thousand Oaks, CA: Pine Forge Press.
- DeVellis, R. F. (2011). *Scale development: Theory and applications* (Vol. 26). London, United Kingdom: Sage.
- Didymus, F. F. (2017). Olympic and international level sports coaches' experiences of stressors, appraisals, and coping. *Qualitative Research in Sport, Exercise and Health*, 9, 214-232. doi:10.1080/2159676X.2016.1261364
- Fabrigar, L. R., MacCallum, R. C., Wegener, D. T., & Strahan, E. J. (1999). Evaluating the

- use of exploratory factor analysis in psychological research. *Psychological Methods*, 4, 272-299. doi:10.1037/1082-989X.4.3.272
- Field, A. (2005). *Discovering statistics using SPSS*. London, United Kingdom: Sage.
- Fletcher, D., & Arnold, R. (2017). Stress in sport: The role of the organizational environment. In C. R. D. Wagstaff (Ed.), *An organizational psychology of sport: Key issues and practical applications* (pp. 83-100). Abingdon, UK: Routledge.
- Fletcher, D., & Hanton, S. (2003). Sources of organizational stress in elite sport performers. *The Sport Psychologist*, 17, 175-195. doi:10.1123/tsp.17.2.175
- Fletcher, D., Hanton, S., & Mellalieu, S. D. (2006). An organizational stress review: Conceptual and theoretical issues in competitive sport. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 321-373). Hauppauge, NY: Nova Science Publishers.
- Fletcher, D., & Scott, M. (2010). Psychological stress in sports coaches: A review of concepts, research and practice. *Journal of Sports Sciences*, 28, 127-137. doi:10.1080/02640410903406208
- Frey, M. (2007). College coaches' experiences with stress—"Problem solvers" have problems, too. *The Sport Psychologist*, 21, 38-57. doi:10.1123/tsp.21.1.38
- Gehlbach, H., Artino, A. R., & Durning, S. (2010). AM last page: Survey development guidance for medical education researchers. *Academic Medicine*, 85, 925. doi:10.1097/ACM.0b013e3181dd3e88
- Graham, J. M., Guthrie, A., & Thompson, B. (2003). Consequences of not interpreting structure coefficients in published CFA research: A reminder. *Structural Equation Modeling*, 10, 142-153. doi:10.1207/S15328007SEM1001_7
- Hanton, S., Fletcher, D., & Coughlan, G. (2005). Stress in elite sport performers: A comparative study of competitive and organizational stressors. *Journal of Sports*

- Sciences*, 23, 1129-1141. doi:10.1080/02640410500131480
- Jones, D., Tanigawa, T., & Weisse, S. (2003). Stress management and workplace disability in the US, Europe and Japan. *Journal of Occupational Health*, 45, 1-7. Retrieved from <http://joh.sanei.or.jp/e/>
- Jowett, S., & Ntoumanis, N. (2004). The Coach-Athlete Relationship Questionnaire (CART-Q): Development and initial validation. *Scandinavian Journal of Medicine and Science in Sports*, 14, 245-257. doi:10.1111/j.1600-0838.2003.00338.x
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31-36. doi:10.1007/BF02291575.
- Knight, C., Reade, I., Selzler, A., & Rodgers, W. (2013). Personal and situational factors influencing coaches' perceptions of stress. *Journal of Sports Sciences*, 31, 1054-1063. doi:10.1080/02640414.2012.759659
- Kubayi, N. A., Coopoo, Y., & Morris-Eyton, H. F. (2015). Challenges faced by sport coaches in South Africa. *African Journal for Physical, Health Education, Recreation and Dance*, 21, 724-732. Retrieved from <http://ajol.info/index.php/ajpherd>
- Kubayi, N. A., Coopoo, Y., & Morris-Eyton, H. F. (2016). Motivational factors among sport coaches in Gauteng Province of South Africa. *African Journal for Physical Activity and Health Sciences*, 22, 33-39. Retrieved from <http://ajol.info/index.php/ajpherd>
- Kubayi, N. A., Coopoo, Y., & Morris-Eyton, H. F. (2017). Work-related constraints in sports coaching: Perceptions of South African female coaches. *International Journal of Sports Science and Coaching*, 12, 103-108. doi:10.1177/1747954116684391
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York City, NY: Springer.
- Levy, A., Nicholls, A., Marchant, D., & Polman, R. (2009). Organisational stressors, coping, and coping effectiveness: A longitudinal study with an elite coach. *International Journal of Sports Science & Coaching*, 4, 31-45. doi:10.1260/1747-9541.4.1.31

- Macnamara, A., & Collins, D. (2011). Development and initial validation of the Psychological Characteristics of Developing Excellence Questionnaire. *Journal of Sports Sciences*, 29, 1273-1286. doi:10.1080/02640414.2011.589468
- Malinauskas, R., Malinauskiene, V., & Dumciene, A. (2010). Burnout and perceived stress among university coaches in Lithuania. *Journal of Occupational Health*, 52, 302-307. Retrieved from <http://joh.sanei.or.jp/e/>
- Martindale, R. J. J., Collins, D., Wang, J. C. K., McNeill, M., Lee, K. S., Sproule, J., & Westbury, T. (2010). Development of the Talent Development Environment Questionnaire for Sport. *Journal of Sports Sciences*, 28, 1209-1221. doi:10.1080/02640414.2010.495993
- McEwan, B. S. (2009). The brain is the central organ of stress and adaptation. *NeuroImage*, 47, 911-913. doi:10.1016/j.neuroimage.2009.05.071
- McLean, K. N., Mallett, C. J., & Newcombe, P. (2012). Assessing coach motivation: The development of the Coach Motivation Questionnaire (CMQ). *Journal of Sport & Exercise Psychology*, 34, 184-207. doi:10.1123/jsep.34.2.184
- Mulaik, S. (2007). There is a place for approximate fit in structural equation modelling. *Personality and Individual Differences*, 42, 883-891. doi:10.1016/j.paid.2006.10.024
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York City, NY: McGraw-Hill.
- Olusoga, P., Butt, J., Hays, K., & Maynard, I. (2009). Stress in elite sports coaching: Identifying stressors. *Journal of Applied Sport Psychology*, 21, 442-459. doi:10.1080/10413200903222921
- Olusoga, P., Maynard, I., Hays, K., & Butt, J. (2012). Coaching under pressure: A study of Olympic coaches. *Journal of Sports Sciences*, 30, 229-239. doi:10.1080/02640414.2011.639384

- Rhind, D. J. A., & Jowett, S. (2012). Development of the coach-athlete relationship maintenance questionnaire (CARM-Q). *International Journal of Sports Science & Coaching*, 7, 121-137. doi:10.1260/1747-9541.7.1.121
- Rhind, D. J. A., Scott, M., & Fletcher, D. (2013). Organizational stress in professional soccer coaches. *International Journal of Sport Psychology*, 44, 1-16. Retrieved from <http://ijsp-online.com/journal>
- Robbins, J. E., Gilbert, J. N., & Clifton, A. M. (2015). Coaching stressors in a Division II historically black university. *Journal of Intercollegiate Sport*, 8, 183-205. doi:10.1123/jis.2014-0105
- Rumbold, J. L., Fletcher, D., & Daniels, K. (2012). A systematic review of stress management interventions with sport performers. *Sport, Exercise and Performance Psychology*, 1, 173-193. doi:10.1037/a0026628.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson Education.
- Seegerstrom, S. C., & Miller, G. E. (2004). Psychological stress and the human immune system: meta-analytic study of 30 years of inquiry. *Psychological Bulletin*, 130, 601-630. doi:10.1037/0033-2909.130.4.601
- Sekaran, U. (2003). *Research methods for business: A skill building approach* (4th ed.). Hoboken, NJ: John Wiley & Sons.
- SPSS v.24 [computer software]. (2016). Retrieved from <http://www-01.ibm.com/support/docview.wss?uid=swg24041224>
- Staff, H. R., Didymus, F. F., & Backhouse, S. H. (2017). Coping rarely takes place in a social vacuum: Exploring antecedents and outcomes of dyadic coping in coach-athlete relationships. *Psychology of Sport and Exercise*, 30, 91-100. doi:10.1016/j.psychsport.2017.02.009

- Stevens, J. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Surujlal, J., & Nguyen, S. (2009). Sources of stress in South African soccer coaches. *African Journal for Physical, Health Education, Recreation and Dance*, (supplement), 113-124. Retrieved from <http://ajol.info/index.php/ajpherd>
- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed). New York City, NY: Harper Collins.
- Thelwell, R. C., Wagstaff, C. R. D., Rayner, A., Chapman, M., & Barker, J. (2017). Exploring athletes' perceptions of coach stress in elite sport environments. *Journal of Sports Sciences*, 35, 44-55. doi:10.1080/02640414.2016.1154979
- Thelwell, R. C., Weston, N. J. V., Greenlees, I. A., & Hutchings, N. V. (2008). Stressors in elite sport: A coach perspective. *Journal of Sports Sciences*, 26, 905-918. doi:10.1080/02640410801885933
- Toering, T. T., Elferink-Gemser, M. T., Jonker, L., van Heuvelen, M. J. G., & Visscher, C. (2012). Measuring self regulation in a learning context: Reliability and validity of the self-regulation scale (SRS). *International Journal of Sport and Exercise Psychology*, 10, 24-38. doi:10.1080/1612197X.2012.645132
- van Teijlingen, E. R., & Hundley, V. (2002). The importance of pilot studies. *Nursing Standard*, 16, 33-36. doi:10.7748/ns2002.06.16.40.33.c3214

510 Table 1

511 *SSCQ components, items, eigenvalues, item loadings, and the percentage of variance that is*512 *explained by each factor*

Factors	Item loading
Environmental stressors (Eigenvalue = 10.54, percentage of variance = 40.53)	
Poorly planned travel arrangements	.872
Long working hours	.817
Poor hygiene conditions	.805
Unsafe competition arena	.796
Distraction while training and/or competing	.743
Intimidated by opponents	.590
My job interfering with family and/or social life	.558
Travelling long distances	.533
Condition of playing surface	.523
Job insecurity	.408
Performance stressors (Eigenvalue = 2.30, percentage of variance = 8.83)	
Being blamed for poor results	.738
Financial incentives dependent on results	.736
High expectation to win	.733
My performance is judged on athletes' results	.576
Task-related stressors (Eigenvalue = 1.96, percentage of variance = 7.55)	
Performing multiple roles (selection, scouting, etc.)	.819
Managing too many squads	.763
Managing other coaches in the programme	.755
Lack of recognition for good coaching	.700
Making an important decision which later I realised was wrong	.605
Interference from management regarding coaching decisions	.461
Athlete stressors (Eigenvalue = 1.60, percentage of variance = 6.16)	
Conflict between me and my athletes	.770
Athletes under-performing in training	.718
Conflict between athletes	.694
Injury to one of my athletes	.583
Lack of discipline and commitment from athletes	.537
One of my athletes signing a pre-contract with another team	.509

515 Table 2

516 *Reliability analyses*

Subscale	Number of items	Cronbach's alpha
Environmental stressors	10	.84
Performance stressors	4	.73
Task-related stressors	6	.89
Athlete stressors	6	.89
Overall scale	26	.93