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The Stellenbosch Mood Scale: A Dual-language Measure of Mood

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Abstract

The present study developed and provided initial validation statistics for the Stellenbosch Mood Scale (STEMS), a dual-language (Afrikaans and English) version of the Profile of Mood States-Adolescents (POMS-A: Terry, Lane, Lane, & Keohane, 1999). Following translation of the POMS-A into Afrikaans using the translation-back translation method, the STEMS was administered to 463 South African athletes (224 males, 239 females; age: range = 18-36 yr. M = 20.3 yr., SD = 1.8 yr.) Confirmatory factor analysis provided support for a 24-item, six-factor measurement model using both independent and multi-sample analyses. The measurement model remained invariant across language groups. Gender differences in mood responses were found. Females reported higher tension and fatigue and lower anger than males. The STEMS showed promising psychometric properties and may have several applications among both Afrikaans- and English-speaking groups in South Africa.

Keywords: Affect; Afrikaans; Emotion; Measurement; Model testing; POMS; South Africa; Sport; STEMS; Structural equations

Research in the sport and exercise psychology domains, as in all areas of psychology, relies heavily upon valid measures of the variables of interest. Given that the majority of published measures in the field are produced in English, it is inevitably a challenge for researchers operating in other languages to find appropriately validated scales. Duda and Allison (1990), in their review of cross-cultural research in sport and exercise psychology, noted a general "void in the field." Since then, many other commentators have echoed the call for researchers to investigate the cultural generalisability of measurement models and relationships among variables (e.g., Gauvin & Russell, 1993; Li, Harmer, Chi, & Vongjaturapat, 1996).

The psychology of mood and emotion in the sport and exercise domains has been researched extensively in the English-speaking world over the past thirty years (see LeUnes & Burger, 1998; LeUnes, 2000). Typically, such investigations have used the Profile of Mood States (POMS: McNair, Lorr, & Droppleman, 1971) or one of its many shortened derivatives (e.g., Grove & Prapavessis, 1992; McNair et al., 1992; Shacham, 1983; Terry, Lane, Lane, & Keohane, 1999) to assess the mood construct. Given its simple format of single- or dual-word mood descriptors, the POMS lends itself very well to translation from one language to another. In its various forms, the POMS has already been translated into many languages, including Arabic (Ahmad, 2002), Chinese (Cheung, 1999), Dutch (Wald & Mellenbergh, 1990), French (Fillion & Gagnon, 1999), German (Bullinger, Heinisch, Ludwig, & Geier, 1990), Korean (Shin & Colling, 2000) and Spanish (Arce-Fernandez, Andrade-Fernandez, & Seoane-Pesqueira, 2000; Perczek, Carver, Price, & Pozo-Kaderman, 2000).

To date, there is a marked paucity of measures translated into any of the 11 official languages of the Republic of South Africa. The purpose of the present study was to translate and report the psychometric properties of a dual Afrikaans-English version of the

POMS-A (Terry et al., 1999) for use in a South African context.

The present study represents an important pre-cursor for further investigation in South Africa of, for example, the potential mood enhancements that accrue from exercise (see Berger & Motl, 2000) or the links between mood and athletic performance (see Beedie, Terry & Lane, 2000). Moreover, from a psychometric perspective, it is important to demonstrate the integrity of existing measures beyond the domain in which they were first developed. Li et al. (1996), for example, emphasized the importance of determining whether structural models of sport and activity behavior remain invariant across different populations. Similarly, Comrey (1988) noted that the establishment of factorial validity is a necessary pre-requisite to the use of any scale in a new population, whether translation of the measure is involved or not.

In a comprehensive review of strategies for the cultural adaptation of measures in sport and exercise psychology, Gauvin and Russell (1993) proposed that the first step for a researcher is to "determine conceptually whether cultural factors will have an influence on the constructs under investigation" (p.899). Furthermore, they noted that "If the answer is no, then only translating and validating the questionnaire may be required if the language spoken in the target cultural group is different" (p.899). In the present study, it was necessary to judge whether the proposed strategy for measuring the mood construct was based on principles that would differ in some influential way between Afrikaans and English speaking South Africans. There were at least three reasons why it was judged that cultural factors would not bias responses to a mood questionnaire translated from English into Afrikaans. First, the proposed measurement strategy (self-report) was not unusual in an Afrikaans context; second, the English version of the POMS-A contained a minimum of colloquial language; and third, the central construct of mood is discussed freely in the Afrikaans culture and is not considered a taboo subject.

The research strategy was further influenced by the propositions of Duda and Hayashi (1998) who emphasized the need to establish psychometric equivalence when translating measures across cultural groups. In particular, they proposed, "If responses to (an) instrument lead to culturally similar coefficients of internal reliability, (and) equivalent factor patterns … then it is assumed that cultural bias has been overcome" (p. 477). Duda and Hayashi specifically advocated the approach used by Li and his colleagues (Li et al., 1996; Li, Harmer, Acock, Vongjaturapat, & Boonverabut, 1997), which tested the factorial invariance of measures across cultural groups.

Mindful of these recommendations, the present study assessed first whether the original measurement model of the POMS-A (Terry et al., 1999) could be confirmed among South African participants, and second whether the factor structure and associated reliabilities remained invariant across Afrikaans- and English-speaking South Africans.

Method

Participants

Participants were 463 student athletes from the University of Stellenbosch, Stellenbosch College and the Stellenbosch Rugby Institute in the Republic of South Africa (224 males, 239 females; age: range = 18 – 36 yr. M = 20.3 yr., SD = 1.8 yr.). Approximately 99% of participants were Caucasians, to reflect the racial characteristics of Afrikaans speakers. All participants were bilingual to a greater or lesser degree but were asked to nominate their first language as Afrikaans (n = 271; 139 males, 132 females) or English (n = 192; 85 males, 107 females). To enhance the generalisability of the findings, a wide range of sports and levels of participation were represented. Sports included badminton, basketball, body building, canoeing, cricket, cross country running, cycling, field hockey, golf, gymnastics, handball, horse riding, judo, korfbal, kung fu, netball, rugby union, scuba diving, soccer, squash, surfing, surf live saving, tennis, track and field,

triathlon, and water polo. Levels of participation ranged from intramural through to senior international level.

Measures

The Stellenbosch Mood Scale (STEMS) is based on the Profile of Mood States – Adolescents (POMS-A: Terry et al., 1999; Terry, Lane, & Fogarty, 2003), which is a derivative of the original Profile of Mood States (POMS: McNair et al., 1971). The POMS-A was developed in four stages. Stage 1 established content validity, whereby a panel of experts assessed an initial item pool for comprehensibility by adolescents and a sample of adolescents identified those items that best described each mood dimension. In Stage 2, a 24-item, six-factor structure was tested using confirmatory factor analysis on adolescents in a classroom setting and adolescent athletes before competition. The hypothesised model was supported in both groups independently and simultaneously. In Stage 3, relationships between POMS-A scores and previously validated measures, that were consistent with theoretical predictions, supported criterion validity. In Stage 4, the measurement model was re-confirmed among adult students and athletes (Terry et al., 2003).

The STEMS, which is reproduced in Appendix A, is a dual language (Afrikaans and English) version of the POMS-A, with each of the six dimensions of mood (anger, confusion, depression, fatigue, tension, vigour) represented by four items. For each item, the STEMS includes the mood descriptor in English (e.g., anxious) and its Afrikaans equivalent (e.g., angstig). The translation-back translation method (Brislin, 1986) was used to establish the best Afrikaans equivalent of each mood descriptor. Participants rated "how you feel right now/hoe jy op hierdie oomblik voel" for each mood descriptor. The STEMS has a five-point response scale, from 0 (not at all/glad nie) to 4 (extremely/uiters).

Procedure

The second author collected the data in a classroom setting to avoid the effects of impending competition. Involvement in the study was voluntary and instructions to participants included a reminder to respond to all items and a statement designed to discourage a social desirability bias (c.f., Martens, Vealey, & Burton, 1990). Participants were invited to request explanation of any item they did not understand but no such explanations were sought.

Data analysis

Confirmatory factor analysis (CFA) using Amos V4.01 (Arbuckle, 1999) was used to test the measurement model, which specified that items were related to their hypothesised factor with the variance of the factor fixed at 1. Consistent with theoretical predictions and previous empirical support, the latent factors anger, confusion, depression, fatigue, and tension were allowed to correlate (see Terry et al., 1999). Vigour was allowed to correlate with depression and fatigue only, as it was hypothesised that relationships between vigour and anger, confusion, and tension would not differ significantly from zero.

The choice of cut-off criteria used to evaluate model adequacy is a contentious issue. Some researchers favour a two-index strategy, with the indices selected on the basis of sample size, model complexity, and the distributional properties of the data (Hu & Bentler, 1999). We followed the approach of Byrne (1998, 2000), Hoyle and Panter (1995) and Kline (1998) who advocated a range of fit indices to judge model adequacy.

The first index used to judge model adequacy was the ratio of χ^2 to degrees of freedom. There is disagreement about what ratio indicates acceptable fit, with estimates varying from two to five. Kline (1998) proposed that a ratio of less than three is acceptable. Two incremental fit indices were used; the comparative fit index (CFI: Bentler, 1990) and the non-normed fit index or Tucker-Lewis index (TLI: Tucker & Lewis,

1973). Incremental fit indices are based on comparisons between the hypothesised model and a null model (in which there are no relationships among the observed variables) and are not influenced by sample size. Kline proposed that values for the CFI and TLI of less than .90 indicate that the hypothesized model could be substantially improved, whereas Hu and Bentler (1999) suggested that, in most circumstances, values should approach .95. The fourth index used was the root mean square error of approximation (RMSEA: Steiger, 1990), which indicates the mean discrepancy between the observed covariances and those implied by the model per degree of freedom, and therefore has the advantage of being sensitive to model complexity. A value of .05 or lower indicates a good fit and values up to .08 indicate an acceptable fit (Browne & Cudeck, 1993). Byrne (1998) described the RMSEA as "one of the most informative criteria in structural equation modelling" (p. 112).

Results

Although the present paper focused primarily on the psychometric properties of the STEMS across two language groups, other between-group comparisons of mood reports were also conducted. Such comparisons are generally considered to be of interest to researchers and practitioners in the area. Descriptive statistics of mood reports for the sample as a whole and grouped by gender and first language are contained in Table 1. A two-way (gender x language) MANOVA showed no interaction effect ($\underline{\text{Wilks}}\ \lambda_{6,454} = .99$, $\underline{p} > .05$) and no effect of first language on mood reports ($\underline{\text{Wilks}}\ \lambda_{6,454} = .99$, $\underline{p} > .05$). There was, however, a significant multivariate effect for gender ($\underline{\text{Wilks}}\ \lambda_{6,454} = .93$, $\underline{p} < .001$) accounting for a total of approximately 7% of the variance in reported mood. Follow-up univariate tests showed that female participants reported higher tension ($\underline{F}_{1,459} = 8.15$, $\underline{p} = .005$) and fatigue ($\underline{F}_{1,459} = 6.94$, $\underline{p} = .009$) but lower anger ($\underline{F}_{1,459} = 6.77$, $\underline{p} = .01$) than males. Effect sizes were very small for each of these three dimensions of mood, explaining less than 2% of the variance.

Mood responses were also compared when participants were grouped according to their level of competition (representative [n = 101], club [n = 225], recreational [n = 137]) but no significant effect was found (Wilks $\lambda_{12,910} = .97$, $p > .05$). No comparison of mood reports by type of sport was made, due to the small number of participants from some sports, which resulted in uneven cell sizes. Given the limited variation in mood responses across gender, language, and level of competition, a table of normative data (see Figure 1) was generated from the data for the whole sample. All subsequent analyses investigated language differences only.

Table 2 shows the alpha coefficients (Cronbach, 1951) of the STEMS for the sample as a whole and grouped by first language. For all six mood scales, the alpha values met or exceeded the .70 threshold of acceptability (Nunnally, 1994). Moreover, in no case would alpha have increased if any item had been deleted from a scale. This suggests that all six scales had an appropriate number of items and showed acceptable internal consistency for all groups.

Confirmatory Factor Analysis

Prior to analysis, data were screened for compliance with the assumptions of univariate and multivariate normality. Significant skewness and kurtosis was evident among some items in the depression and anger scales. Given the tendency for a large proportion of athletes to report very low scores for these scales and for relatively few to report high scores (see Terry et al., 1999, 2003) the skewness and kurtosis were not surprising. Although 18 multivariate outliers were identified, inspection of individual cases showed that response patterns for these participants were unusual but plausible, and therefore no attempt was made to transform variables or to trim the data set.

Byrne (2000), in summarising the recommended procedure for testing factorial invariance across populations, advised that it is useful to first establish baseline models for

each group separately (p. 176). The English-language version of the POMS-A, which can be found in the right-hand column of Appendix A, has already been validated in previous studies with English-speaking populations. However, it has not been used with an English-speaking South African population so the first stage of the confirmatory factor analysis was aimed at testing the hypothesised factor structure on the covariance matrix obtained from this group. The χ^2 /df ratio and RMSEA met the criterion values for an acceptable fit, while the CFI and TLI values fell between traditional (Kline, 1998; Byrne, 2000) and recent (Hu & Bentler, 1999) benchmarks: χ^2 /df = 1.73; CFI = 0.93; TLI = 0.92; RMSEA = 0.06.

Modification indices suggested that the fit would be improved significantly if a covariance pathway were fitted between the error terms for “tired” and “sleepy”, two of the indicator items for fatigue. Previous studies (e.g., Terry et al., 2003) also reported specific variance shared by these two items, suggesting that the English terms are close enough in meaning for respondents to sometimes find it difficult to distinguish between them. On conceptual grounds, this modification was allowed. A further link was suggested between the error terms for “exhausted” and “worn out”. Again, it is not difficult to see how these two terms could share specific variance beyond that captured by the underlying fatigue factor, so a covariance pathway was fitted between the error terms for these two items. Modification indices also suggested that “worn out”, an item intended as a marker of fatigue, should be allowed to cross-load on confusion. The resulting fit indices for the revised model are shown in the first row of Table 3. In addition to these satisfactory fit statistics, with the exception of the cross-loading of “worn out” on confusion, standardized factor loadings were all high in magnitude (above .50 with 50% above .70), thus adding further support to the validity of the factor structure.

Having supported the factorial validity of the STEMS for English-speaking South

Africans, the next step in data analysis involved fitting the measurement model to the Afrikaans-speaking group, who answered items in the left-hand column of STEMS (see Appendix A). Accordingly, the original model was fitted to the covariance matrix obtained from the Afrikaans group. Fit statistics, however, were marginal: χ^2 /df = 2.27; CFI = 0.89; TLI = 0.87; RMSEA = 0.07. Modification indices suggested a number of changes to the model. The biggest improvement was effected by allowing "worn out" to cross-load on confusion, a modification that was also required for the English-speaking group. When this change was made, fit indices met the criteria specified by writers such as Kline (1998) and Byrne (2000): χ^2 /df = 2.03; CFI = 0.90; TLI = 0.91; RMSEA = 0.06.

Close inspection of residuals, however, suggested that the model could be improved further if pathways were fitted between the covariance terms for "nervous" and "anxious" and also for "depressed" and "downhearted". It seems that when these words were translated into their Afrikaans forms, specific shared variance was apparent within each of these pairs beyond that accounted for by their underlying factors. Fitting the covariance pathway allowed this specific variance to be modelled. A similar situation existed for the English speakers with the words "sleepy" and "tired" and "exhausted" and "worn out". It is interesting to observe that when these words were translated into their Afrikaans equivalents, there was no additional shared variance to be explained other than that accounted for by their underlying factors. In other words, the Afrikaans translation removed specific semantic overlap between some pairs of words (e.g., "tired" and "sleepy") but introduced the same sort of overlap elsewhere (e.g., "nervous" and "anxious"). Fitting these two covariance pathways resulted in a model with good fit by conventional standards (see row 2 of Table 3). In terms of the individual standardized factor loadings, again with the exception of the cross-loading of "worn out" on confusion, factor loadings were all high in magnitude (above .50 with 50% above .70).

The next step was to examine the congruency of the model against data in the two first language groups simultaneously, using multi-sample CFA. As Byrne (2000) and others have noted, there are various forms of factorial invariance. In this first test, we simply tested whether or not the measurement model itself fitted both groups, with factor loadings left free to vary. Using information gleaned from the individual analyses, the model that was fitted to the data from the two groups allowed the cross-loading of "worn out" on both the fatigue and confusion factors, a modification that was required for both language groups in the individual analyses. The resulting fit statistics were acceptable by conventional standards: χ^2 /df = 3.73; CFI = 0.92; TLI = 0.91; RMSEA = 0.04. Allowing the additional modifications that were made for each of the language groups separately (four covariance pathways in total) resulted in the fit statistics that are reported in Row 3 of Table 3. Using the same model, and fitting additional restrictions so that the factor loadings and covariance pathways between the factors were constrained to be equal, fit statistics were again acceptable (see Row 4 of Table 3). More restrictive tests of factorial invariance are possible but they are "not usually necessary" (Byrne, 2000, p.175; see also Kline, 1998, p.225).

Overall, the combined results of the preliminary single-group analyses and the simultaneous multi-group confirmatory analyses add weight to the claim that the hypothesised measurement model of the STEMS can be reproduced across samples. In the single-group analyses, the changes that were made to the baseline model for each sample were relatively minor, involving the fitting of an additional regression pathway that resulted in a significant but not major (< .50) standardized factor loading. All hypothesised standardized factor loadings were above .50, the majority of them above .70. Two additional covariance pathways between error terms were fitted. The fact that the pathways were different for the two samples is of theoretical interest and we return to this point in

the Discussion section. In the multi-group analysis, we were able to fit an identical revised model to both groups with factor loadings and covariances constrained to be equal. No attempt was made to test for the invariance of error variances/covariances and residuals, a step that Byrne (2000) describes as "an overly restrictive test of the data" (p. 175).

To conclude the data analysis, scale scores were computed for the whole sample. The inter-correlations among the POMS scales are generally considered to be important in establishing the construct validity of the measures. These inter-correlations are shown in Table 4.

Discussion

The present study assessed the psychometric properties of the Stellenbosch Mood Scale, a new measure that presents mood descriptors in both Afrikaans and English. The ease with which the respondents completed the measure suggested that the dual-language format of the STEMS was easy to understand for either an Afrikaans or English population.

When compared to normative data for the POMS-A, the scale from which the STEMS was derived, the mean mood reports of the present participants fell between the 47^{th} and 59^{th} percentiles of the normative data for adult athletes (see Terry et al., 2003). The present participants reported lower tension, similar vigour, but higher anger, confusion, depression, and fatigue than the norm. These differences may be a function of competition effects, in that the normative data reported by Terry et al. referred to athletes just prior to competition whereas the present data was gathered away from the competition environment. A similar pattern of differences in athletes' mood reports between pre-competition and classroom settings was found previously using the original POMS (Terry & Lane, 2000). Although a table of normative scores for the STEMS has been generated from the present data, it should be noted that these norms apply specifically to a classroom

setting and were based on a "how you feel right now" response time frame. Other settings, such as pre- or post-competition, and other response time frames, such as "how you felt during the past week" have been shown previously to influence mood reports (see Stevens, Lane, & Terry, 2001).

Results supported the internal consistency of all six scales among Afrikaans and English speakers, and the sample as a whole. Model fit was acceptable across language groups. Overall, the hypothesized factor structure of the STEMS was judged to be tenable. However, our findings have highlighted the difficulty experienced by some participants of distinguishing between certain items in the depression and fatigue scales. Theoretically, the difference between, for example, "sleepy" and "tired" or "depressed" and "downhearted" is one of degree; "sleepy" represents a greater degree of fatigue than "tired", "depressed" represents greater sadness than "downhearted." It appears that subtle distinctions of this nature vary between the two languages. Some appear to work better in English whereas other distinctions are clearer in Afrikaans, although it should be noted this created only a very slight language bias.

It is concluded that the Stellenbosch Mood Scale has shown acceptable psychometric properties and is a suitable measure for use with Afrikaans or English speakers. However, although this initial evaluation of the STEMS has yielded promising psychometric characteristics, other aspects of its psychometric integrity still need to be assessed, such as predictive and criterion validity. Given the shortage of appropriate criterion measures in the Afrikaans language, it is not possible at the present time to establish the concurrent validity of the scale, although this has already been supported for the English version (see Terry et al., 1999, 2003).

The STEMS may have a wide range of applications in a South African context. From a research perspective, there are many unanswered questions pertaining, for example,

to the effects of exercise on mood and the effects of mood on sport performance. Importantly, the brevity of the STEMS facilitates mood assessment in research environments where a limited amount of time is available for data collection such as before sport competition. For the applied practitioner, there are a variety of proposed uses for regular mood profiling (see Terry, 1995) which may benefit the elite sporting teams of South Africa. However, given that South Africa has 11 official languages, there is also a need for the STEMS to be translated into some or all of these languages. It is acknowledged that the present study focused on only one of the many cultural groups in South Africa and there is a clear need for further research to develop measures applicable to other populations within that country.

Although a translation-back translation method was used, it has been proposed that, "translation is at best approximate" (Triandis, 1994, p. 81). Triandis advocated an approach that is sensitive to the cultural specificity or universality of the concept to be translated. In the present study it was judged that the concept of mood is conceptualised the same among Afrikaans and English speakers in South Africa, and it is acknowledged that this judgment was not verified empirically.

Finally, it should be noted that the STEMS provides a measure of depressed mood at a given point in time not a measure of clinical depression. For clinical depression, Tennen, Hall, and Affleck (1995) proposed that self-report measures should be used in conjunction with follow-up interviews. Therefore, the validity of the STEMS for use with clinical populations is unknown.

References

Ahmad, A. (2002). Development and validation of an Arabic measure of mood: The Arabic Mood Inventory. Unpublished doctoral dissertation, Brunel University.

Arbuckle, J.L. (1999). AMOS program manual. Chicago, IL: Small Waters Corporation.

Arce-Fernandez, C., Andrade-Fernandez, E.M., & Seoane-Pesqueira, G. (2000). Spanish adaptation of the Profile of Mood States (POMS). Psicothema, 12, 47-51.

Beedie, C. J., Terry, P. C., & Lane, A. M. (2000). The Profile of Mood States and athletic performance: Two meta-analyses. Journal of Applied Sport Psychology, 12, 49-68.

Bentler, P.M. (1990). Comparative fit indexes in structural models. Psychological Bulletin, 107, 238-246.

Berger, B. G., & Motl, R. W. (2000). Exercise and mood: A selective review and synthesis of research employing the Profile of Mood States. Journal of Applied Sport Psychology, 12, 69-92.

Brislin, R. W. (1986). The wording and translation of research instruments. In Lonner, W.J., & Berry, J.W. (Eds.), Field methods in cross-cultural research (pp. 1337-164). Newbury Park, CA: Sage.

Browne, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In Bollen, K.A., & Long, J.S. (Eds.), Testing structural equation models, (pp.132-162). Newbury, CA: Sage.

Bullinger, M., Heinisch, M., Ludwig, M., & Geier, S. (1990). Scales for the assessment of emotional well-being: Psychometric analysis of the Profile of Mood States (POMS) and of the Psychological General Well-Being Index (PGWI). Zeitschrift fuer Differentielle und Diagnostische Psychologie, 11, 53-61.

Byrne, B.M. (1998). Structural equation modelling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications and programming. Mahwah, NJ: Lawrence Erlbaum.

Byrne, B.M. (2000). Structural equation modelling with AMOS: Basic concepts, applications and programming. Mahwah, NJ: Lawrence Erlbaum.

Cheung, S.Y. (1999). Chinese translation of the Profile of Mood States (POMS). Journal of the International Council for Health, Physical Education, Recreation, Sport, and Dance, 35(2), 24-27.

Comrey, A.L. (1988). Factor-analytic methods of scale development in personality and clinical psychology. Journal of Consulting and Clinical Psychology, 56, 754-761.

Cronbach, L.J. (1951). Coefficient alpha and internal structure of tests. Psychometrika, 16, 297-334.

Duda, J.L., & Allison, M.T. (1990). Cross-cultural analysis in exercise and sport psychology: A void in the field. Journal of Sport and Exercise Psychology, 12, 114.131.

Duda, J.L., & Hayashi, C.T. (1998). Measurement issues in cross-cultural research within sport and exercise psychology. In J.L.Duda (Ed.), Advances in sport and exercise psychology measurement, (pp. 471-483). Morgantown, WV: Fitness Information Technology.

Fillion, L., & Gagnon, P. (1999). French adaptation of the shortened version of the Profile of Mood States. Psychological Reports, 84, 188-190.

Gauvin, L., & Russell, S. (1993). Sport-specific and culturally adapted measures in sport and exercise psychology research: Issues and strategies. In R.N.Singer, M.Murphey, & L.K.Tennant (Eds.) Handbook of research on sport psychology, (pp. 891-900). New York: Macmillan.

Grove, J.R., & Prapavessis, H. (1992). Preliminary evidence for the reliability and validity of an abbreviated Profile of Mood States. International Journal of Sport Psychology, 23, 93-109.

Hoyle, R.H., & Panter, A.T. (1995). Writing about structural equation models. In Hoyle, R. H. (Ed.), Structural equation modeling: Concepts, issues, and applications, (pp. 158-175). Newbury, CA: Sage.

Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modelling, 6, 1-55.

Kline, P. (1998). Principles and practice of structural equation modelling. New York: The Guildford Press.

LeUnes, A. (2000). Updated bibliography on the Profile of Mood States in sport and exercise psychology research. Journal of Applied Sport Psychology, 12, 110-113.

LeUnes, A., & Burger, J. (1998). Bibliography on the Profile of Mood States in sport and exercise, 1971-1995. Journal of Sport Behavior, 21, 53-70.

Li, F., Harmer, P., Acock, A., Vongjaturapat, N., & Boonverabut, S. (1997). Testing the cross-cultural validity of TEOSQ and its factor covariance and mean structures across gender. International Journal of Sport Psychology, 28, 271-286.

Li, F., Harmer, P., Chi, L., & Vongjaturapat, N. (1996). Cross-cultural validation of the Task and Ego Orientation in Sport Questionnaire. Journal of Sport and Exercise Psychology, 18, 392-407.

Martens, R., Vealey, R.S., & Burton, D. (1990). Competitive anxiety in sport. Champaign, IL: Human Kinetics.

McNair, D.M., Lorr, M., & Droppleman, L.F. (1971). Manual for the Profile of Mood States. San Diego, CA: Educational and Industrial Testing Services.

McNair, D.M., Lorr, M., & Droppleman, L.F. (1992). Revised manual for the Profile of Mood States. San Diego, CA: Educational and Industrial Testing Services.

Nunnally, J.C. (1994). Psychometric theory (3rd ed.). New York: McGraw-Hill.

Perczek, R., Carver, C.S., Price, A.A., & Pozo-Kaderman, C. (2000). Coping, mood, and aspects of personality in Spanish translation and evidence of convergence with English versions. Journal of Personality Assessment, 74, 63-87.

Shacham, S. (1983). A shortened version of the Profile of Mood States. Journal of Personality Assessment, 47, 305-306.

Shin, Y.H., & Colling, K.B. (2000). Cultural verification and application of the Profile of Mood States (POMS) with Korean elders. Western Journal of Nursing Research, 22, 68-83.

Steiger, J.H. (1990). Structural model evaluation and modification: An interval estimation approach. Multivariate Behavioral Research, 25, 173-180.

Stevens, M., Lane, A.M., & Terry, P.C. (2001). The impact of response set on measures of mood [abstract]. Journal of Sports Sciences, 19, 82.

Tennen, H., Hall, J., & Affleck, G. (1995). Depression research methodologies in the Journal of Personality and Social Psychology: A review and critique. Journal of Personality and Social Psychology, 68, 870-884.

Terry, P.C. (1995). The efficacy of mood state profiling with elite performers: A review and synthesis. The Sport Psychologist, 9, 309-324.

Terry, P.C., & Lane, A.M. (2000). Development of normative data for the Profile of Mood States for use with athletic samples. Journal of Applied Sport Psychology, 12, 69-85.

Terry, P. C., Lane, A. M., & Fogarty, G. J. (2003). Construct validity of the Profile of Mood States – Adolescents for use with adults. Psychology of Sport and Exercise, 4, 82-96.

Terry, P.C., Lane, A.M., Lane, H.J., & Keohane, L. (1999). Development and validation of a mood measure for adolescents. Journal of Sports Sciences, 17, 861-872.

Triandis, H.C. (1994). Culture and social behaviours. New York: McGraw-Hill.

Tucker, L.R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. Psychometrika, 38, 1-10.

Wald, F.D., & Mellenbergh, G.J. (1990). The shortened version of the Dutch translation of the Profile of Mood States (POMS). Nederlands Tijdschrift voor de Psychologie en haar Grensgebieden, 45, 86-90.

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Table 1

Descriptive Statistics of Scores on the Stellenbosch Mood Scale among Athletes Grouped by Gender and First Language

	Group									
Scale	Total (N = 463)		Male (n = 224)		Female (n = 239)		Afrikaans (n = 271)		English (n = 192)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Anger	1.91	2.41	2.23	2.60	1.62	2.18	1.96	2.48	1.84	2.31
Confusion	2.59	2.85	2.46	2.60	2.72	3.06	2.67	2.78	2.49	2.95
Depression	1.86	2.58	1.76	2.27	1.96	2.84	1.92	2.59	1.79	2.57
Fatigue	5.48	3.72	5.00	3.51	5.92	3.86	5.45	3.50	5.52	4.02
Tension	3.29	2.96	2.90	2.60	3.66	3.23	3.45	2.84	3.07	3.12
Vigour	8.59	3.54	8.91	3.39	8.30	3.66	8.74	3.55	8.39	3.53

Table 2

Alpha Coefficients of the Stellenbosch Mood Scale among Athletes Grouped by First Language

Group	Anger	Confusion	Depression	Fatigue	Tension	Vigour
All (N = 463)	.73	.82	.84	.84	.78	.86
Afrikaans (n = 271)	.72	.79	.81	.82	.75	.88
English (n = 192)	.76	.85	.89	.87	.83	.85

Table 3

Confirmatory Factor Analysis of the Stellenbosch Mood Scale

Group	N	χ^2:df ratio	CFI	TLI	RMSEA
English	192	1.61	.94	.93	.06
Afrikaans	271	1.88	.93	.91	.06
Multi-sample 1	463	1.75	.93	.92	.04
Multi-sample 2	463	1.83	.92	.91	.04

Table 4

Scale Inter-correlations of the Stellenbosch Mood Scale Among 463 Athletes

Scale	Anger	Confusion	Depression	Fatigue	Tension
Confusion	.47*				
Depression	.59*	.65*			
Fatigue	.34*	.33*	.42*		
Tension	.30*	.55*	.43*	.31*	
Vigour	-.08	.08	-.21*	-.41*	.00

* $p < .01$ (2-tailed)

Figure Captions

Stellenbosch Mood Scale

Profile Sheet - Adult Athletes

Appendix A

The Stellenbosch Mood Scale

Naam/Name: Datum/Date:

Hieronder is ’n lys van woorde wat die gevoelens van mense beskryf. Lees asseblief elkeen noukeurig. Omsirkel daarna die antwoord wat die beste beskryf hoe jy op hierdie oomblik voel.

Below is a list of words that describe feelings people have. Please read each one carefully. Then circle the answer that best describes how you feel right now.

	Glad nie Not at all	Effens A little	Taamlik Moderately	Baie Quite a bit	Uiters Extremely	
Paniekerig	0	1	2	3	4	Panicky
Lewendig	0	1	2	3	4	Lively
Verward	0	1	2	3	4	Confused
Vermoeid	0	1	2	3	4	Worn out
Neerslagtig	0	1	2	3	4	Depressed
Mismoedig	0	1	2	3	4	Downhearted
Vererg	0	1	2	3	4	Annoyed
Uitgeput	0	1	2	3	4	Exhausted
Deurmekaar	0	1	2	3	4	Mixed up
Vaak	0	1	2	3	4	Sleepy
Verbitterd	0	1	2	3	4	Bitter
Ongelukkig	0	1	2	3	4	Unhappy
Angstig	0	1	2	3	4	Anxious
Bekommerd	0	1	2	3	4	Worried
Energiek	0	1	2	3	4	Energetic
Ellendig	0	1	2	3	4	Miserable
Ontwrig	0	1	2	3	4	Muddled
Senuweeagtig	0	1	2	3	4	Nervous
Kwaad	0	1	2	3	4	Angry
Aktief	0	1	2	3	4	Active
Moeg	0	1	2	3	4	Tired
Humeurig	0	1	2	3	4	Bad tempered
Op en wakker	0	1	2	3	4	Alert
Onseker	0	1	2	3	4	Uncertain