Research article

Investigating the Appropriateness and Validity of the Academic Motivation Scale-College Version for South African First-Year University Students

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Abstract

South African universities have one of the lowest graduation rates in the world, especially amongst first-year university students. South Africa's first-year university students are taxed with tremendous challenges. One of the most important amongst these challenges is considered to be academic motivation, which is strongly related to students' academic success. Despite this, to date, little work has been undertaken to source and validate a reliable instrument to measure students' academic motivation. This article is based on the proposition that there is a pressing need for a valid and reliable instrument that measures academic motivation and its effect on students' academic success. The psychometric properties of the Academic Motivation Scale-College version were examined for first-year university students. The findings are promising for using this scale to measure academic motivation of first-year university students.

Keywords

Academic Motivation Scale-College version; convergent validity; criterion validity; discriminant validity; factorial validity; first-year university students; reliability

Introduction

Higher Education Institutions (HEIs) in South Africa are confronted with tremendous challenges and are generally not adequately equipped with warning systems or methods to proactively identify students at risk (South Africa, DHET, 2014). As a result, the university performance of first-year students may be compromised and motivation can become impaired as students begin to doubt their ability to achieve academic success (South Africa, DHET, 2014; Haynes, Daniels, Stupnisky, Perry & Hladkyj, 2008).

Academic motivation is conceptualised as a student's level of interest, their attitude as well as their determination towards their academic course, whereby purpose-driven action (whether mental or physical) is initiated and sustained (Jones, 2009; Schunk, Pintrich

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& Meece, 2008). Students who are academically motivated are described as effective, meticulous, driven, focused, well-prepared and knowledgeable (Fraser & Killen, 2005). Accordingly, students who are academically motivated experience feelings of satisfaction, competence, and stimulation, and pursue rewarding activities (Köseoğlu, 2013; Vallerand et al., 1992). On the other hand, students who lack academic motivation will not apply extra effort, resulting in poor academic performance, often doubt their ability to succeed academically and doubt their intentions for pursuing a tertiary education (Fraser & Killen, 2005; Legault, Green-Demers & Pelletier, 2006).

Ryan and Deci (1985, 1991) categorise motivation as intrinsic, extrinsic or a-motivated. Based on this categorisation, Vallerand and his colleagues (1992, 1993) developed the Academic Motivation Scale-College version (AMS-C), a measure of college students' academic motivation in education. The AMS-C has been validated for students attending HEIs in countries including Canada, England, Portugal and the United States of America (USA) (Baker, 2004; Cokley, 2000; Cokley, Bernard, Cunningham & Motoike, 2001; Lopes et al., 2018; Vallerand et al., 1993). It was also tested for its cross-cultural factorial validity amongst students in the USA and Ghana (Osei Akoto, 2014).

Although the AMS-C has been validated in other countries, it is challenging to transfer psychometric instruments across cultures (De Klerk, Boshoff & Van Wyk, 2009). Various studies resulted in the conclusion that without revalidating an instrument, it is risky to apply instruments developed in other countries to a South African sample (De Klerk et al., 2009). These risks include language ability and translation equivalence, as some individuals might interpret words as well as meaning of words in a different manner, including reverse-worded items and mixed-worded scales (Van Eeden & Mantsha, 2007; Wong, Rindfleisch & Burroughs, 2003).

The AMS-C is a promising measure to use in the HEI setting. However, no studies could be found that tested the applicability and validity of the AMS-C for South African university students. The objective of the present study was to investigate the adequacy and appropriateness in terms of validity and reliability of the AMS-C amongst first-year university students in the South African context; more specifically, to test the factorial validity, reliability as well as the convergent, discriminant, and criterion validity of the AMS-C.

Literature Review

Factorial validity and reliability

The three components of motivation are defined as follow: (1) Intrinsic motivation is the doing of an activity not for the few dissociable consequences, but the inherent satisfaction thereof; (2) Extrinsic motivation is the completing of an activity to realise some dissociable outcomes; and (3) Amotivation is a lack of intention to act or the absence of motivation (Ryan & Deci, 2000a; 2000b).

The AMS-C measures the three types of motivation with seven sub-scales (Vallerand et al., 1992; Stover et al., 2012):

1. Intrinsic motivation includes the following subscales:
   - *To know*: when a task or subject is carried out for the pleasure of obtaining the knowledge;
   - *Towards accomplishment*: when satisfaction is derived from generating products or when one's personal limits are superseded; and
   - *Experienced stimulation*: when activities are developed to discover pleasing aesthetics, intellectual or sensorial sensations.
2. Extrinsic motivation includes the following subscales:
   - *Identified*: when choices are driven by extrinsic motives;
   - *Introjected*: when behaviour is guided by the need to improve one's self-esteem and/or to circumvent anxiety and guilt that may arise from not carrying out a certain task; and
   - *External regulation*: when behaviours are driven by others in an attempt to avoid punishment or to receive a reward.
3. Amotivation is a single dimension measured with four items. It is characterised by an indiviual's lack of purpose, an absence of power over their actions, or explains an inability to act.

With regard to the factorial validity of the AMS-C, support for the seven-subscale structure was found amongst a sample of students in the USA (Cokley et al., 2001). However, a more recent study conducted amongst a sample of undergraduate students in Britain, found that the broader three-factor structure (i.e. *intrinsic motivation*, *extrinsic motivation* and *amotivation*) is a better fit to the data (Baker, 2004). The three-factor structure was suggested by Baker (2004) as a solution to the high intercorrelations found between some of the subscales. Thus, it is expected that a three-factor structure will be a better fit to the data compared to a seven-factor structure.

H_1: Academic motivation comprises a three-factor structure, consisting of intrinsic motivation, extrinsic motivation and amotivation.

Various studies indicate favourable reliability scores for the AMS-C. The original study conducted by Vallerand et al. (1992) found Cronbach's alpha coefficients for the seven-factor structure ranging between 0.83 and 0.86. In another English-speaking sample the internal consistency ranged from 0.60 to 0.86 (Vallerand et al., 1993). In a more recent study, the internal consistencies in a sample of USA students also proved to be satisfactory, with Cronbach's alpha coefficients ranging from 0.65 to 0.77 (Osei-Akoto, 2014). It is therefore expected that the three factors of the AMS-C will be reliable.

H_2: The three factors of the Academic Motivation Scale-College version (AMS-C) will show high internal consistency (a³ 0.70).

Convergent validity and discriminant validity

Convergent validity tests if constructs that are anticipated to be related are, in fact, related to one another; while discriminant validity tests whether constructs that should not have any relationship, in fact, do not have any relationship with one another (Shuttleworth, 2009). The current study examined whether the three AMS-C factors (intrinsic motivation, extrinsic motivation, and amotivation) were moderately related to each other and ultimately explained the relationships between the latent variables as well as the strength of the relationships.

H_3: The three AMS-C factors are moderately related to each other and will demonstrate convergent validity.

H_4: The three AMS-C factors are moderately related to each other and will demonstrate discriminant validity.

Criterion validity

Criterion validity is used to measure the capability of an instrument to give an explanation for variance in any other variable with the motive of imparting evidence in order to predict future results (Fraenkel, Wallen & Hyun, 1993). For the purpose of this study, two important outcomes of student motivation were included: students' satisfaction with their studies as well as self-reported academic performance.

The relationship between study satisfaction and academic motivation can be explained by examining theory on the three innate psychological needs for satisfaction outlined and described in the Self-determination Theory (STD) (Ryan & Deci, 2000b). These innate psychological needs for satisfaction that inform self-motivation include autonomy, competence, and relatedness (Ryan & Deci, 2000b; Zhang, Solomon, Kosma, Carson & Gu, 2011). Therefore, the conditions of these innate psychological needs either hinder or support students' academic motivation (Zhang et al., 2011). Consequently, academically motivated students experience feelings of satisfaction, competence, and stimulation, and pursue activities that provide rewards (Köseoğlu, 2013;Vallerand et al., 1992).

H_5: Academic motivation will be significantly and positively related to satisfaction with studies.

The concept of academic motivation can also be associated with students' self-rated academic performance. A study of disadvantaged South African students found that adjustment to university and academic performance was positively correlated with *intrinsic motivation* (Petersen et al., 2009). *Intrinsically motivated* students use increased productive studying strategies, prefer demanding tasks, enjoy their classes more and exhibit consistent student involvement (Ames & Archer, 1988). *Extrinsically motivated* behaviours are implemented for some outcome external to the task itself, such as obtaining rewards or circumventing retribution (Ryan & Deci, 2000b). A study conducted by Baker (2004) concluded that both *intrinsic* and *extrinsic* motivation, as well as *amotivation* on some level, predict students' academic performance.

H6: Academic motivation will be significantly and positively related to self-reported academic performance.

Method

Research design

A cross-sectional design was used to perform data collection and attainment of the research objectives for the present study.

Participants and procedure

Permission for the study was granted by the Ethics Committee of the North-West University (ethical certificate number: NWU-HS-2014-0165). Data was gathered during August to November 2018 through a web-based survey. The researcher ensured that prior to inviting students for voluntary participation, awareness was created about the study. All the appropriate information regarding the purpose and intentions of the study and informed consent was incorporated and explained.

Participants were first-year students studying at a South African university. The researcher only included full-time students registered for their first year of study. A convenience sample method was used ($N = 611$) of whom 394 (64.5%) were female, 217 (35.5%) were male and age ranged between 17 and 19 years. In terms of ethnic origin, 338 (55.3%) participants were black, 236 (38.6%) were white, 28 (4.6%) were coloured, and six (1.0%) were Indian.

Research Instruments

In addition to a biographical questionnaire, the following instruments were used:

Academic motivation was measured by the AMS-C (Vallerand et al. 1992), which consists of 28 items and is measured on a seven-point scale (1 = *Does not correspond at all* to 7 = *Corresponds exactly*, with a midway point at 4 = *Corresponds moderately*). The 28 items, divided into four items for each of the seven subscales, were used to answer the following question: "Why do you go to college?" in an effort to measure the following:

- Intrinsic motivation – to know (e.g. 'because I experience pleasure and satisfaction while learning new things').
- Intrinsic motivation – towards accomplishment (e.g. 'for the pleasure I experience while surpassing myself in my studies').
- Intrinsic motivation – to experience stimulation (e.g. 'for the intense feelings I experience when I am communicating my own ideas to others').
- Extrinsic motivation – identified (e.g. 'because I think that a college education will help me better prepare for the career I have chosen').
- Extrinsic motivation – introjected (e.g. 'to prove to myself that I am capable of completing my college degree').
- Extrinsic motivation – external regulation (e.g. 'because with only a high-school degree I would not find a high-paying job later on').
- Amotivation (e.g. 'Honestly, I don't know; I really feel that I am wasting my time in school.').

Satisfaction with studies was measured with the use of adapted items based on work-related scales developed by Hellgren, Sjöberg and Sverke (1997). Items were adapted to fit the student context and are measured with three items (e.g. "I am satisfied with my studies"). All items were scored on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Self-reported academic performance was measured by asking participants to provide two self-reported indications of their academic performance including their academic average (an average of all their subjects) and a main average (an average of their main subjects.

Data Analysis

A confirmatory factor analysis (CFA) was used to determine factorial validity. Based on the findings of previous validation studies reported in literature, two models were tested: a seven-factor model (specifying all seven subscales of the AMS-C) and a three-factor model (including the three broad factors of the AMS-C: extrinsic motivation, intrinsic motivation and amotivation).

In order to test the models' goodness-of-fit, the following fit indices were applied: traditional chi-square (χ^2) statistic, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA) and the Standardised Root Mean Square Residual (SRMR). An adequate model fit was considered when the CFI and TLI values were larger than 0.90, thus a conformist process was used in this study (Byrne, 2001). Concerning the RMSEA, values below the cut-off threshold of 0.08 indicated a good model fit (Browne & Cudeck, 1993). The SRMR cut-off point was set at less than 0.05 (Hu & Bentler, 1999). The reliability of the scales was determined by calculating Cronbach's alpha coefficients. The composite reliability indicator was calculated where a value of 0.70 and above was considered acceptable (Akkucuk, 2014; De Farias Júnior, Mendonça, Florindo & Barros, 2014).

To determine the convergent validity, the correlation matrix was examined to identify how the AMS-C factors are related to each other. The correlation coefficients, where effect sizes are used to generate the practical significance of the results, were used to determine the relationship that exists between the variables (Steyn & Swanepoel, 2008). Furthermore, $r \geq 0.30$ (medium effect) and $r \geq 0.50$ (large effect) were used as cut-off points for the practical significance of the correlation coefficients (Cohen, 1988). With regard to discriminant validity, the correlations between all the latent variables need to be below Brown's (2015) 0.85 guideline. Additionally, CFA was used to compare measurement models where the correlations between the factors of interest are constrained to 1.00. When the correlation is unconstrained, a non-significant difference would indicate that discriminant validity does not exist.

Finally, the criterion validity of the AMS-C was tested. Regression paths were included in the final measurement model. The standardised beta coefficient values (β) and the significance of the regression paths as well as the size and direction thereof were considered. The variance explained in the criterion variables (in terms of R^2) were also taken into account.

Results

Factorial validity

CFA was used to test two competing measurement models: a seven-factor model (specifying all seven subscales of the AMS-C), and a three-factor model (specifying the three broad factors of the AMS-C). The results can be seen in Table 1.

Table 1: Results of the measurement models

Model	χ^2	*df*	CFI	TLI	RMSEA	SRMR
Seven-factor	1177.62	329	0.95	0.94	0.07	0.05
Three-factor (before)	2148.36	347	0.90	0.90	0.09	0.08
Three-factor (after)	1984.67	344	0.91	0.90	0.09	0.07

Notes: χ^2 = chi-square; df = degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; SRMR = Standardised root mean residual

At first glance, the seven-factor measurement model appeared to be a better fit compared to the three-factor model. However, very high intercorrelations were found between some of the subscales of the seven-factor measurement model:

- Intrinsic motivation – to know and intrinsic motivation – experience stimulation: $p = 1.006$
- Intrinsic motivation – towards accomplishment and intrinsic motivation – experience stimulation: $p = 0.95$
- Intrinsic motivation – to know and intrinsic motivation – towards accomplishment: $p = 0.92$
- Extrinsic motivation – introjected and extrinsic motivation – external regulation: $p = 0.85$

The fit indices of the alternative three-factor model were also not optimal (RMSEA = 0.09). To explore how the model fit could be improved, modification indices were inspected. It was evident that error terms should be allowed between three pairs of items, including:

- Extrinsic motivation – external regulation, item 3: "Because I want to have 'the good life' later in my life"; and item 4: "In order to have a better salary later on."
- Extrinsic motivation – introjected, item 12: "Because I want to show myself that I can succeed in my studies"; and intrinsic motivation – towards accomplishment, item 20: "Because my university allows me to experience a personal satisfaction in my quest for excellence in my studies."
- Intrinsic motivation – experience stimulation, item 14: "For the pleasure that I experience when I learn interesting things"; and intrinsic motivation – to know, item 22: "For the pleasure that I experience when I discover new things that I have never known before."

After these error terms were allowed to correlate, the three-factor model was improved. More specifically, the χ^2/degrees of freedom ratio was slightly above 3.00 (Kline, 1998; Ivan, Herteliu & Nosca, 2008). The fit also improved in terms of the CFI and SRMR indices (Hoyle, 1995), although the RMSEA was still slightly above the suggested cut-off point of 0.08 (Browne & Cudeck, 1993; Van de Schoot, Lugtig & Hox, 2012). Based on these results, it seems that a three-factor model should be preferred above the seven-factor model. All of the items had statistically significant and acceptable factor loadings (λ), ranging between 0.38 and 0.92. Since the standard errors for all the items of the three factors were small, accurate estimates are assumed (Payton, Miller & Raun, 2000). These results provide evidence for *Hypothesis 1*.

Reliability, convergent and discriminant validity

Table 2 provides the reliabilities and correlation matrix for the latent variables.

Table 2: Reliabilities and correlation matrix for the latent variables

Variables	α	1	2	3	4	5	6
1. Amotivation	0.87	-	-	-	-	-	-
2. Intrinsic motivation	0.92	-0.23★	-	-	-	-	-
3. Extrinsic motivation	0.86	-0.34★	0.72★	-	-	-	-
4. Satisfaction with studies	0.93	-0.40★	0.58★	0.35★	-	-	-
5. General academic average	N/A	-0.28★	0.24★	0.07	0.34★	-	-
6. Main academic average	N/A	-0.23★	0.29★	0.11	0.38★	0.79★	-

Notes: α = Cronbach's alpha reliability coefficient; ★ = Correlations are statistically significant $p \leq 0.001$; Values ≤ 0.30 = medium effect; Values ≥ 0.50 = large effect

Cronbach's alpha coefficients ($\alpha \geq 0.70$) were calculated for the three-factor model to establish the reliability or internal consistency of the AMS-C (Cronbach, 1951; Nunnally & Bernstein, 1994; Tabachnick & Fidell, 2001). As shown in Table 2, all the reliability coefficients were acceptable, therefore support and evidence were provided for *Hypothesis 2*.

The results in Table 2 show that extrinsic motivation, intrinsic motivation and amotivation all correlated with one another. The effect sizes ranged from small to large. These results provide evidence for the strength of the relationships between the academic motivation variables, supporting *Hypothesis 3*.

The results also provide evidence for the discriminant validity of the AMS-C, where the correlations between the subscales were below the 0.85 guideline (r's ≤ 0.85; Brown, 2015), providing evidence and support for *Hypothesis 4*. Furthermore, a series of models were tested where the correlations between the factors were constrained to 1.00 and then compared to the unconstrained model. All these models showed that the constrained model did not perform better than the unconstrained model ($p \leq 0.05$), providing further support for *Hypothesis 4*.

Criterion validity

Criterion validity of the AMS-C was investigated with specifying the structural model by using the final three-factor measurement model and inserting structural paths in line with the study's hypotheses. The results of the structural model are shown in Table 3 below.

Table 3: Regression paths for the structural model

Structural path	β	S.E.	*p*	Result
Intrinsic motivation → Satisfaction with studies	0.70	0.05	0.001*	Significant
Extrinsic motivation → Satisfaction with studies	-0.27	0.05	0.001*	Significant
Amotivation → Satisfaction with studies	-0.34	0.04	0.001*	Significant
Intrinsic motivation → General academic average	0.40	0.07	0.001*	Significant
Extrinsic motivation → General academic average	-0.32	0.07	0.001*	Significant
Amotivation → General academic average	-0.30	0.05	0.001*	Significant
Intrinsic motivation → Main academic average	0.45	0.06	0.001*	Significant
Extrinsic motivation → Main academic average	-0.29	0.07	0.001*	Significant
Amotivation → Main academic average	-0.23	0.05	0.001*	Significant
*Notes: β = beta coefficient; S.E. = Standard error; p = Two-tailed statistical significance; * = p ≤ 0.001*				

The structural model showed an acceptable fit. The χ^2/degrees of freedom ratio was slightly above 3 (Kline, 1998; Ivan et al., 2008) and the fit indices showed acceptable fit: CFI = 0.93; TLI = 0.92; RMSEA = 0.07 (Browne & Cudeck, 1993; Hoyle, 1995; Van de Schoot et al., 2012). All the regression paths were significant ($p \leq 0.05$). These results provide evidence to support *Hypotheses 5* and *6*.

Discussion

The primary purpose of the study was to validate the Academic Motivation Scale-College version (AMS-C) in a sample of first-year South African students by examining the factorial validity, reliability, convergent, discriminant and predictive validity of this instrument.

The results of the CFA showed that very high intercorrelations were found between some of the subscales of the original seven-factor model. These high intercorrelations indicate problems with multicollinearity, which result in the unsuccessful calculation of discriminant validity (Kline, 2005). For this reason, Kline (2005) suggests to either eliminate one of the variables or combine the high-correlated variables. The seven-factor model was therefore not considered an acceptable measurement model. The model fit of the three-factor model was also not entirely satisfactory, but improved after error terms were allowed between three pairs of items which contained conceptually similar words (DeLisi, Hochstetler & Murphy, 2003). Although the RMSEA index was 0.09, a recent study by McNeish, An and Hancock (2018) stated that new statistical evidences and simulations have shown that these fit indices are highly influenced by measurement quality. Therefore, a three-factor model is presented as the best factor-solution for the AMS-C and is in line

with other studies that found support for a three-factor model (Baker, 2004; Stover et al., 2012). The findings showed acceptable Cronbach's alpha reliability coefficients ($\alpha \geq 0.70$) for all three AMS-C factors (Nunnally & Bernstein, 1994; Tabachnick & Fidell, 2001): intrinsic motivation ($\alpha = 0.92$), extrinsic motivation ($\alpha = 0.86$), and amotivation ($\alpha = 0.87$), demonstrating good reliability for the three factors. Convergent and discriminant validity were also established.

The criterion validity of the AMS-C was examined to determine whether the three factors of academic motivation were significant predictors of students' satisfaction with studies and students' self-rated academic performance. The results showed that intrinsic motivation was the strongest predictor for all three outcomes: Satisfaction with studies, general academic average and main academic average. Extrinsic motivation and amotivation both negatively predicted all three outcomes. Extrinsic motivation proved to be the strongest predictor for both general academic motivation and main academic motivation. On the other hand, amotivation proved to be a slightly stronger predictor for satisfaction with studies than extrinsic motivation.

Practical Implications

The present study shows preliminary support that the AMS-S has potential to validly and reliably measure first-year students' academic motivation. The use of the AMS-C could enable HEIs to adequately determine different motivation levels of first-year university students, specifically because students experience many challenges during their first year at university and are therefore at risk of decreased academic motivation. HEIs are therefore encouraged to use instruments like the AMS-C to proactively identify students at-risk and make available supporting interventions, where students can be made aware of their motivation levels and seek assistance as an additional resource if necessary. These supporting interventions can empower students to not only reach their academic goals but also reach their long-term goal of graduating. Consequently, universities are assisted by an additional tool that empowers them to deliver more work-ready graduates.

Limitations and Recommendations

The study was conducted at one specific university and not nationally across different institutions. This limits the applicability of the findings. It is recommended that replication studies are conducted nationally across South Africa. These studies could also add to the existing literature by obtaining more knowledge about the outcomes in similar and dissimilar contexts. This study made use of a cross-sectional design. To draw more significant conclusions about the relationship of the three academic motivation factors as well as students' satisfaction with their studies and students' self-rated academic performance and other outcomes, a longitudinal research exploration is suggested. In addition, a mixed-methods research design can be included, such as interviews, reflection diaries or focus groups to explore the meaning of the items of the AMS-C and minimise the potential of measurement and non-measurement error (Dillman, Smyth & Christian, 2014).

Although this study used Classical Test Theory (CTT), a widely known and predominant measurement paradigm in test analysis, there are also shortcomings to this approach (see Rusch et al., 2017). Future studies can also include the advantages of Item Response Theory (IRT). The basic assumption of IRT is the independence of the latent ability of the participant on the content of the measure or test (Baghaei et al., 2016). IRT permits analysis of responses from a specific sample to a bank of items and assumes that responses from participants depend on non-measureable respondent characteristics (i.e. latent traits and on the characteristics of items (Baker, 2001). This could add valuable information on the adequacy and appropriateness of tests used in the higher education context.

Conclusion

In summary, the results provided stronger support for a three-factor model. Favourable reliability scores provided evidence for the internal consistency. Results also supported the convergent and divergent validity of the AMS-C. Finally, the three academic motivation factors predicted students' satisfaction with their studies as well as students' self-rated performance, providing evidence for the criterion validity of the AMS-C.

Authors' Note

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References

Akkucuk, U. (2014). *Handbook of research on developing sustainable value in economics, finance, and marketing*. Turkey, TR: Bogazici University. https://doi.org/10.4018/978-1-4666-6635-1

Ames, C. & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology*, 80(3), 260-267. https://doi.org/10.1037/0022-0663.80.3.260

Baghaei, P. & Tabatabaee Yazdi, M. (2016). The logic of latent variable analysis as validity evidence in psychological measurement. *The Open Psychology Journal*, 9(1), 168-175. https://doi.org/10.2174/1874350101609010168

Baker, F. (2001). *The basics of item response theory*. ERIC clearinghouse on assessment and evaluation, College Park, MD: University of Maryland.

Baker, S.R. (2004). Intrinsic, extrinsic, and amotivational orientations: Their role in university adjustment, stress, well-being, and subsequent academic performance. *Current Psychology*, 23(3), 189-202. https://doi.org/10.1007/s12144-004-1019-9

Brown, T.A. (2015). *Confirmatory factor analysis for applied research*. Second edition. New York: Guilford Press.

Browne, M.W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In: K.A. Bollen & J.S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: SAGE.

Byrne, B.M. (2001). Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. *International Journal of Testing*, 1(1), 55-86. https://doi.org/10.1207/S15327574IJT0101_4

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. Second edition. Orlando, CA: Academic Press.

Cokley, K.O. (2000). Examining the validity of the academic motivation scale by comparing scale construction to self-determination theory. *Psychological Reports*, 86(2), 560-564. https://doi.org/10.2466/pr0.2000.86.2.560

Cokley, K.O., Bernard, N., Cunningham, D. & Motoike, J. (2001). A psychometric investigation of the academic motivation scale using a United States sample. *Measurement and Evaluation in Counseling and Development*, 34(2), 109-119. https://doi.org/10.1080/07481756.2001.12069027

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 22, 297-334. https://doi.org/10.1007/BF02310555

De Farias Júnior, J.C., Mendonça, G., Florindo, A.A. & Barros, M.V.G.D. (2014). Reliability and validity of a physical activity social support assessment scale in adolescents – ASAFA Scale. *Revista Brasileira de Epidemiologia (Brazilian Journal of Epidemiology)*, 17, 355-370. https://doi.org/10.1590/1809-4503201400020006ENG

De Klerk, J.J., Boshoff, A.B. & Van Wyk, R. (2009). Measuring meaning in life in South Africa: Validation of an instrument developed in the USA. *South African Journal of Psychology*, 39(3), 314-325. https://doi.org/10.1177/008124630903900306

Deci, E.L. & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum. https://doi.org/10.1007/978-1-4899-2271-7

DeLisi, M., Hochstetler, A. & Murphy, D.S. (2003). Self-control behind bars: A validation study of the Grasmick et al. scale. *Justice Quarterly*, 20(2), 241-263. https://doi.org/10.1080/07418820300095521

Dillman, D.A., Smyth, J.D. & Christian, L.M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. Fourth edition. Hoboken, NJ: John Wiley & Sons.

Fraenkel, J.R., Wallen, N.E. & Hyun, H.H. (1993). *How to design and evaluate research in education*. Second edition. New York, NY: McGraw-Hill.

Fraser, W. & Killen, R. (2005). The perceptions of students and lecturers of some factors influencing academic performance at two South African universities. *Perspectives in Education*, 23(1), 25-40.

Haynes, T.L., Daniels, L.M., Stupnisky, R.H., Perry, R.P. & Hladkyj, S. (2008). The effect of attributional retraining on mastery and performance motivation among first-year college students. *Basic and Applied Social Psychology*, 30(3), 198-207. https://doi.org/10.1080/01973530802374972

Hellgren, J., Sjöberg, A. & Sverke, M. (1997). Intention to quit: Effects of job satisfaction and job perceptions. In: F. Avallone, J. Arnold & K. De Witte (Eds.), *Feelings work in Europe* (pp. 411-423). Milan, Italy: Guerini.

Hoyle, R.H. (1995). The structural equation modelling approach: Basic concepts and fundamental issues. In: R.H. Hoyle (Ed.), *Structural equation modelling: Concepts, issues and applications* (pp. 1-15). Thousand Oaks, CA: SAGE.

Hu, L.T. & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling: A Multidisciplinary Journal*, 6(1), 1-55. https://doi.org/10.1080/10705519909540118

Ivan, I., Herteliu, C. & Nosca, G. (2008). Text entities' metrics. *Journal of Applied Quantitative Methods*, 3(1), 1-120.

Jones, B.D. (2009). Motivating students to engage in learning: The MUSIC model of academic motivation. *International Journal of Teaching and Learning in Higher Education*, 21(2), 272-285.

Kline, R.B. (1998). *Principles and practice of structural equation modelling.* New York: Guilford Press.

Kline, R.B. (2005). *Principles and practice of structural equation modelling.* New York: Guilford Press.

Köseoglu, Y. (2013). Academic motivation of the first-year university students and the self-determination theory. *Educational Research and Reviews*, 8(8), 418.

Legault, L., Green-Demers, I. & Pelletier, L. (2006). Why do high school students lack motivation in the classroom? Toward an understanding of academic amotivation and the role of social support. *Journal of Educational Psychology*, 98(3), 567. https://doi.org/10.1037/0022-0663.98.3.567

Lopes, P., Silva, R., Oliveira, J., Ambrósio, I., Ferreira, D., et al.. (2018). Rasch analysis on the academic motivation scale in Portuguese university students. *NeuroQuantology*, 16(3). https://doi.org/10.14704/nq.2018.16.3.1062

McNeish, D., An, J. & Hancock, G.R. (2018). The thorny relation between measurement quality and fit index cutoffs in latent variable models. *Journal of personality assessment*, 100(1), 43-52. https://doi.org/10.1080/00223891.2017.1281286

Nunnally, J.C. & Bernstein, I.H. (1994). *Psychometric theory*. Third edition. New York: McGraw-Hill.

Osei Akoto, E. (2014). Cross-cultural factorial validity of the academic motivation scale. *Cross Cultural Management*, 21(1), 104-125. https://doi.org/10.1108/CCM-11-2011-0100

Payton, M.E., Miller, A.E. & Raun, W.R. (2000). Testing statistical hypotheses using standard error bars and confidence intervals. *Communications in Soil Science and Plant Analysis*, 31(5), 547-551. https://doi.org/10.1080/00103620009370458

Petersen, I.H., Louw, J. & Dumont, K. (2009). Adjustment to university and academic performance among disadvantaged students in South Africa. *Educational Psychology*, 29(1), 99-115. https://doi.org/10.1080/01443410802521066

Rusch, T., Lowry, P.B., Mair, P. & Treiblmaier, H. (2017). Breaking free from the limitations of classical test theory: Developing and measuring information systems scales using item response theory. *Information & Management*, 54(2), 189-203. https://doi.org/10.1016/j.im.2016.06.005

Ryan, R.M. & Deci, E. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325-346. https://doi.org/10.1080/00461520.1991.9653137

Ryan, R.M. & Deci, E.L. (2000a). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R.M. & Deci, E.L. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54-67. https://doi.org/10.1006/ceps.1999.1020

Schunk, D.H., Pintrich, P.R. & Meece, J.L. (2008). *Motivation in education*. Saddle River, NJ: Pearson.

Shuttleworth, M. (2009). Convergent and discriminant validity. https://explorable.com/convergent–validity [Accessed 2 September 2019].

South Africa, DHET (Department of Higher Education and Training) (2014). White Paper for Post-School Education and Training: Building an expanded, effective and integrated post-school system.

Steyn, H.S. & Swanepoel, C.J. (2008). *Praktiese statistiek (Practical Statistics)*. Second edition. Potchefstroom, RSA: North-West University.

Stover, J.B., De la Iglesia, G., Boubeta, A.R. & Liporace, M.F. (2012). Academic Motivation Scale: Adaptation and psychometric analyses for high school and college students. *Psychology Research and Behavior Management*, 5, 71. https://doi.org/10.2147/PRBM.S33188

Tabachnick, B.G. & Fidell, L.S. (2001). *Using multivariate statistics*. Fourth edition. New York: Harper & Row.

Vallerand, R.J., Pelletier, L.G., Blais, M.R., Brière, N.M., Senecal, C. & Vallières, É.F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52(4), 1003-1017. https://doi.org/10.1177/0013164492052004025

Vallerand, R.J., Pelletier, L.G., Blais, M.R., Brière, N.M., Senecal, C. & Vallières, É.F. (1993). On the assessment of intrinsic, extrinsic, and amotivation in education: Evidence on the concurrent and construct validity of the Academic Motivation Scale. *Educational and Psychological Measurement*, 53(1), 159-172. https://doi.org/10.1177/0013164493053001018

Van de Schoot, R., Lugtig, P. & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, 9(4), 486-492. https://doi.org/10.1080/17405629.2012.686740

Van Eeden, R. & Mantsha, T.R. (2007). Theoretical and methodological considerations in the translation of the 16PF5 into an African language. *South African Journal of Psychology*, 37(1), 62-81. https://doi.org/10.1177/008124630703700105

Wong, N., Rindfleisch, A. & Burroughs, J.E. (2003). Do reverse-worded items confound measures in cross-cultural consumer research? The case of the material values scale. *Journal of consumer research*, 30(1), 72-91. https://doi.org/10.1086/374697

Zhang, T., Solmon, M.A., Kosma, M., Carson, R.L. & Gu, X. (2011). Need support, need satisfaction, intrinsic motivation, and physical activity participation among middle school students. *Journal of Teaching in Physical Education*, 30(1), 51-68. https://doi.org/10.1123/jtpe.30.1.51

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