The psychometric properties of the Academic Motivation Scale-College version of South African first-year university students

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Mini-dissertation accepted in partial fulfilment of the requirements for the degree Master of Arts in Industrial and Organisational Psychology at the North-West University

Supervisor: Prof K Mostert

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COMMENTS

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The psychometric properties of the Academic Motivation Scale-College version of South African first-year university students

South African universities have one of the lowest graduation rates in the world (DHET, 2014). However, there are various reasons why students are unsuccessful in their pursuit of a tertiary education. Arguably, the most important reason is a lack of academic motivation. Often the sudden transition from high school to university, the increase in demands and the dire lack of resources lead to students' absence of motivation. Consequently, many students drop out in their first year of study, affecting both them and the higher education institution (HEI) negatively. The present study, therefore, argues that both HEIs as well as their first-year students could benefit from a valid and reliable instrument, adopted for use in South Africa, to proactively identify students at risk.

The general objective was to validate the Academic Motivation Scale-College version (AMS-C) for use among first-year university students. The general objective of this study was achieved by examining the factorial validity, reliability, convergent, discriminant and predictive validity of the AMS-C. The data used in the present study was gathered through use of convenience sampling and a sample of 611 first-year students attending a HEI in South Africa was attained. Further, a cross-sectional design was used in the present study. To determine the above-mentioned psychometric properties of the AMS-C, Mplus 8.1, a statistical analysis program was used.

The results show that a seven-factor model and a three-factor model were tested. Both models showed acceptable fit. However, very high intercorrelations were found between some of the sub-scales of the seven-factor measurement model. Based on these results, it seemed that a three-factor model should be preferred above the seven-factor model. Three independent academic motivation factors were found and were termed intrinsic motivation, extrinsic motivation and amotivation. The AMS-C three-factor model further showed acceptable levels of factorial validity, reliability, convergent and discriminant validity. Lastly, it was also established that academic motivation significantly predicted students' satisfaction with their studies as well as academic performance.

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TO WHOM IT MAY CONCERN

This is to confirm that I have edited the master's dissertation titled "The psychometric properties of the Academic Motivation Scale-College version of South African first-year university students" by Adéle Kapp (Student number: 25092014).

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Kind regards

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The psychometric properties of the Academic Motivation Scale-College version of South African first-year university students

Keywords

Academic motivation, Academic Motivation Scale-College version, intrinsic motivation, extrinsic motivation, amotivation, factorial validity, reliability, convergent validity, discriminant validity, criterion validity, study satisfaction, academic performance, first-year university students.

South African universities have one of the lowest graduation rates in the world (South Africa, Department of Higher Education and Training, DHET, 2014). However, there are various reasons why students are unsuccessful in their pursuit of a tertiary education. Arguably, the most important reason is a lack of academic motivation. Often the sudden transition from high school to university, the increase in demands and the dire lack of resources lead to students' absence of motivation. Consequently, many students drop out in their first year of study, affecting both them and the higher education institution (HEI) negatively. The present study, therefore, argues that both HEIs as well as their first-year students could benefit from a valid and reliable instrument, adapted for use in South Africa, to proactively identify students at risk.

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were found and were termed intrinsic motivation, extrinsic motivation and amotivation. The AMS-C three-factor model further showed acceptable levels of factorial validity, reliability, convergent and discriminant validity. Lastly, it was also established that academic motivation significantly predicted students' satisfaction with their studies as well as academic performance.

After conclusions for the study were drawn, recommendations were made for universities and students, and for future research.

Opsomming

Titel

Die psigometriese eienskappe van die Akademies Motiveringskaal-Kollege (A*cademic Motivation Scale-College*) weergawe van Suid-Afrikaanse eerstejaaruniversiteitstudente

Sleutelwoorde

Akademiese motivering, Akademies Motiveringskaal-Kollege (A*cademic Motivation Scale-College*) weergawe, intrinsieke motivering, ekstrinsieke motivering, amotivering, faktoriale geldigheid, betroubaarheid, konvergente geldigheid, diskriminante geldigheid, kriteriumgeldigheid, studentetevredenheid, akademiese prestasie, eerstejaaruniversiteitstudente.

Suid-Afrikaanse universiteite het een van die laagste gradueringsyfers ter wêreld (South Africa, Department of Higher Education and Training, DHET, 2014). Daar is egter verskeie redes waarom studente onsuksesvol is in hul strewe na tersiêre onderrig. Die belangrikste rede is waarskynlik ’n gebrek aan akademiese motivering. Dikwels lei die skielike oorgang vanaf die hoërskool na die universiteit, die toename in eise en die ernstige gebrek aan hulpbronne tot die studente se gebrek aan motivering. Gevolglik val baie studente uit in hul eerste studiejaar, wat hulle sowel as die hoëronderwysinstelling negatief beïnvloed. Hierdie studie voer dus aan dat beide die hoëronderwysinstellings en hul eerstejaarstudente baat kan vind by ’n geldige en betroubare instrument wat aangepas is om in Suid-Afrika gebruik te word, om studente wat die gevaar loop om te druip, proaktief te identifiseer.

Die algemene doel was om die weergawe van die Akademies Motiveringskaal-Kollege (*Academic Motivation Scale-College*) te bekragtig vir gebruik onder eerstejaarstudente deur die volgende te toets: faktoriale geldigheid, betroubaarheid, konvergente, diskriminante en voorspellingsgeldigheid. ’n Steekproef van 611 eerstejaarstudente van Suid-Afrikaanse hoëronderwysinstellings is ingesluit om data deur middel van ’n gemaksteekproefneming te versamel. Mplus 8.1 is gebruik om die psigometriese eienskappe van die AMS-C te bepaal.

Die resultate toon dat ’n sewefaktormodel en ’n driefaktormodel getoets is. Beide modelle het ’n aanvaarbare passing getoon. Daar is egter baie hoë interkorrelasies tussen sommige van die subskale van die sewefaktormetingsmodel gevind. Op grond van hierdie resultate lyk dit asof ’n driefaktormodel bo die sewefaktormodel verkies moet word. Drie onafhanklike akademiese motiveringsfaktore is gevind en word intrinsieke motivering, ekstrinsieke motivering en amotivering genoem. Verder het die AMS-C driefaktormodel aanvaarbare vlakke van faktoriale geldigheid, betroubaarheid, konvergente en diskriminante geldigheid getoon. Laastens is ook vasgestel dat akademiese gemotiveerdheid die studente se tevredenheid met hul studies sowel as akademiese prestasie beduidend voorspel het.

Nadat gevolgtrekkings uit die studie gemaak is, is aanbevelings vir universiteite en studente en vir toekomstige navorsing gedoen.

CHAPTER 1

1. INTRODUCTION

The purpose of the present study was to validate the Academic Motivation Scale-College version (AMS-C) for use among first-year university students. To achieve the desired outcomes of the study the factorial validity, reliability, convergent, discriminant and predictive validity of the AMS-C was investigated to establish if the AMS-C was suitable for use amongst South-African first-year university students.

This chapter comprises of the problem statement and provides an outline of past research conducted on the impact of motivation on student's academic performance. Thereafter, research questions are presented and supplemented by the study's objectives and hypotheses. Afterwards, the preceding chapters of this study are presented in a brief layout.

1.1 PROBLEM STATEMENT

South African universities have one of the lowest graduation rates in the world – 15% compared to the international norm of 25% for students in three-year degree programmes, excluding distance learners (South Africa, Department of Higher Education and Training, DHET, 2014). Goodman et al. (2011) argued that any university's success is dependent on the academic excellence of its students. However, student success can be hindered by many factors. From an institutional perspective, higher education institutions (HEIs) in South Africa are faced with tremendous challenges, as the demand for participation within HEIs increases (South Africa, DHET, 2014). Institutions are confronted with an increasing demand for student access, successful student success rates as well as addressing serious drop-out rates (South Africa, DHET, 2014). HEIs generally do not have adequate warning systems or methods for proactively identifying at-risk students (South Africa, DHET, 2014). It was reported by the Department of Education that 120 000 students registered in HE in 2000, from those registered students 30% did not pass their first year of study and as a result dropped out (as cited in Letseka & Maile, 2008, p. 5).

From a student perspective, South African student success at HEIs is hindered by insufficient finances, lack of proper living conditions as well as the absence of social or academic support during the first year at university (South Africa, DHET, 2014; Murray, 2014). Inadequate student performance can also be attributable to students who are not prepared for the transition from high school to higher education (South Africa, DHET, 2014). Transitioning from high school to university can be extremely challenging for first-year students (Clinciu, 2013; Ruthig, Perry, Hall & Hladkyj, 2004) specifically adjusting to increased demands and responsibilities (Haynes, Daniels, Stupnisky, Perry & Hladkyj, 2008). For most university students, these demands, and responsibilities include continuous stressors due to convoluted emotional, relationship, financial and academic changes (Darling, McWey, Howard & Olmstead, 2007). The new reality and expectations of university life might overwhelm some first-year students who are under the impression that university is similar to high school, even though there is a significant gap between secondary education and higher education (Letseka & Maile, 2008). As a result of this 'reality shock', initial university performance may be put at risk and motivation can become impaired as students begin to distrust their capability to achieve academic success (Haynes et al., 2008).

South African HEIs have a responsibility to address issues related towards students' academic success to improve the academic and student experience and to retain students. According to Knoop (2016), HEIs have three main functions, namely (a) qualifying young people for the demands of life; (b) socialising young people into different social premises; and (c) selecting young people for diverse careers accessible in society. HEIs thus have an important role to play as students are essentially the employees of tomorrow. HEIs may benefit from acquiring the knowledge and skills of various organisational specialists, including Industrial and Organisational (IO) Psychologists. As stated by the South African Department of Health (2011), IO Psychologists can assist organisations, including HEIs, by "facilitating individual and group processes for effective organisational functioning; designing, and implementing training programmes for effective organisational functioning; designing, and developing strategies in consumer behaviour; developing interventions to ameliorate poor performance in work settings; and designing and implementing programmes based on understanding ergonomics" (p. 10). Therefore, IO psychologists can assist HEIs by designing and/or implementing programmes and strategies aimed at, for example, improving student and academic staff performance or proactively identifying 'at-risk' students. IO psychologists can also provide expert opinions and recommendations regarding overall organisational functioning, where student success plays a major role in the financial functioning of a university.

Despite HEIs' responsibility towards their students, various other factors are also considered important for students' academic success. Many of these contributing factors have been researched before, such as the relationship between the student and the academic institution (Fraser & Killen, 2005). This relationship proved to be significant in that, if a student experiences a powerful individual connection with the academic institution, they are most likely to be encouraged to study more productively (Fraser & Killen, 2005). Studies also showed that students' academic success is determined by their understanding of their individual learning abilities. As a result of this 'understanding', students have a self-awareness of the knowledge they possess, and have the drive to expand their current capabilities, knowledge and skills (Borkowski, Carr, Rellinger & Pressley, 1990; Meltzer & Montague, 2001; Pressley, Borkowski, Forrest-Pressley, Gaskins & Wile, 1993; Lee Swanson & Hoskyn, 1999; Wong, 1991). Students' test competence and academic competence are also considered to be significant contributing factors to academic success (Sansgiry, Bhosle & Sail, 2006). Lastly, studies have also noted that students' self-efficiency, effort and socio-psychological factors such as age, family environment, life stress, financial pressure, and coping efforts as well as the persistence needed to learn are all significant contributors to students' academic success (Fraser & Killen, 2005; Malefo, 2000; McKenzie & Schweitzer, 2001; Meltzer, Katzir-Cohen, Miller & Roditi, 2001; Nicholls, 1978; Thatcher, Fridjhon & Cockcroft, 2007).

Among the factors contributing to student success, one of the most important is considered to be academic motivation (Vallerand et al., 1992). Entwistle (1988) argued that academic motivation can be strongly related to different levels of students' academic performance as it describes the differences in the amount of effort that students are willing to apply to their studies (Entwistle, 1988). There is a distinction between general motivation and academic motivation. General motivation is conceptualised as an internal or external state that stimulates, guides and sustains behaviour (Matthews, Hoessler, Jonker & Stockley, 2013; Köseoğlu, 2013), while academic motivation is conceptualised as students' level of interest, their attitude as well as their determination towards their academic course, through which purpose-driven action, whether mental or physical, is initiated and sustained (DiPerna & Elliott, 1999; Jones, 2009; Schunk, Pintrich & Meece, 2008). Accordingly, both students and lecturers characterise high academically motivated students as successful, hard-working, independent, well prepared and wise (Fraser & Killen, 2005). As a result, these academically motivated students experience feelings of satisfaction, competence, stimulation and pursue activities that provide rewards (Köseoğlu, 2013; Vallerand et al, 1992). On the other hand, students who lack academic motivation experience feelings of frustration and dissatisfaction that can hinder efficiency and success (Legault, Green-Demers & Pelletier, 2006). This lack of academic motivation may cause students to question their motives for attending university and might become less inclined to finish

their education (Vallerand et al., 1992). A South African study conducted by Fraser and Killen (2005) found that students who lack academic motivation will not apply extra effort and this will consequently lead to poor academic performance (Fraser & Killen, 2005).

Since the twentieth century interest into the topic of motivation has escalated with many theories clarifying motivation. Early theories of motivation include Maslow's Theory of Hierarchy of Needs (Maslow, 1954) as well as the Two-Factor Theory of Herzberg and colleagues (Herzberg, Mausner & Snyderman, 1959). The Theory of Needs (McClelland, 1961) and the Cognitive Evaluation Theory (De Charms, 1968; Deci, 1975) were introduced afterwards.

More recently, the Self-determination Theory, developed by Deci and Ryan (1985), emerged as one of the most frequently used theories to explain motivational behaviour. According to this theory, people have the natural need for stimulation and learning from a young age. Ryan and Deci (1985, 1991) categorise behaviour as being either intrinsically motivated, extrinsically motivated or amotivated. Intrinsic motivation is defined as the doing of an activity not for the few dissociable consequences, but the inherent satisfaction thereof (Ryan & Deci, 2000a). An example of intrinsic motivation is the student that attends class because they experience it as stimulating and rewarding to broaden their knowledge in specific areas pertaining to their field of study (Vallerand et al., 1992). Contrary to intrinsic motivation, extrinsic motivation is described as the completing of an activity so as to realise some dissociable outcome (Ryan & Deci, 2000b). An example of extrinsic motivation is the student that for him or her to obtain a good grade studies hard– behaviours are therefore driven by rewards external to the behaviour itself (Köseoğlu, 2013). Amotivation is defined as a lack of purpose or the absence of motivation (Ryan & Deci, 2000b; Köseoğlu, 2013). An example of amotivation is the student who questions the purpose of studying everyday (Vallerand et al., 1992).

Based on the categorisation of motivational behaviour by Deci and Ryan (1985), Vallerand et al. (1992, 1993) developed the Academic Motivation Scale-College version (AMS-C), a measure of college students' academic motivation in education. The AMS-C was originally established in French (Vallerand, Blais, Brière & Pelletier, 1989). It was then translated into English, and when it was tested for psychometric properties, it was proven to be satisfactory (Vallerand, et al., 1992; Vallerand et al., 1993). The AMS-C consists of 28 items divided into four items for each of the seven subscales that answer the question why students attend college (Vallerand et al., 1992). The AMS-C measures three types of motivation as mentioned above:

1) Intrinsic motivation includes the following subscales (Vallerand et al., 1992; Stover, de la Iglesia, Boubeta & Liporace, 2012):
    - Intrinsic motivation – to know when a task or subject is carried out for the pleasure of obtaining the knowledge;
    - Intrinsic motivation – towards accomplishment: when satisfaction is derived from generating products or when one's personal limits are superseded; and
    - Intrinsic motivation – experienced stimulation: when activities are developed to discover pleasing aesthetics, intellectual or sensorial sensations.

2) Extrinsic motivation includes the following subscales (Vallerand et al., 1992; Stover et al., 2012):
    - Extrinsic motivation – identified: when choices are driven by extrinsic motives;
    - Extrinsic motivation – 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
    - Extrinsic motivation – 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. Amotiavtion is characterised by the individual's that lack purpose, experiences an absence of power over their actions, or explains an inability to act (Stover et al., 2012).

The transfer of psychometric instruments across different cultures can be problematic (De Klerk, Boshoff & Van Wyk, 2009). These problems might occur as individuals observe their collective environment through their own biased background (Marsella, Dubanoski, Hamada & Morse, 2000; Prinsloo & Ebersöhn, 2002). Research has shown that some scales provide acceptable validity but only when administered to inherent English or Afrikaans speaking people within a South African sample (Abrahams & Mauer, 1999; De Klerk et al., 2009). The outcome of these studies confirm that it is dangerous to apply instruments developed in other countries (e.g. USA) to a South African sample without revalidating these instruments (De Klerk et al., 2009). When considering the literature available in South Africa, certain aspects of academic motivation within the South African context have been explored (Fraser & Killen, 2005; Sikhwari, 2014; Watson, Mcsorley, Foxcroft & Watson, 2004). In particular, a study conducted by Watson et al. (2004) explored the motivation orientation and learning strategies in sample of first-year university students (Watson et al., 2004). In order to

determine the orientation students, have towards motivation, they made use of the Motivated Strategies for Learning Questionnaire (MSLQ) (Watson et al., 2004). However, the MSLQs only focus on the source of motivation in conjunction with learning strategies and do not provide the researcher with the different levels of academic motivation in a comprehensive approach towards academic performance (Chamane, 2016; Kožuh et al., 2015).

Other studies concerning motivation within the South African context include a study conducted by Sikhwari (2014) that examined the relationship between motivation, self-concept and academic achievement. This study used a self-constructed measuring instrument, but only the reliability of the measuring instrument was reported. The study also solely focused on the motivation of students in conjunction with self-concept and highlighted the differences between males and females (Sikhwari, 2014). Another study conducted by Fraser and Killen (2005) also used a self-constructed measuring instrument to determine the different perceptions of students and lecturers and the relationship with academic performance (Fraser & Killen, 2005). This study only highlighted that academic motivation does affect students' academic performance, but no information on the psychometric properties of the motivation measure was reported. Finally, a study exploring the pathways taken by adjustment and other psychological variables such as academic motivation included several items from the AMS-C (Petersen, Louw & Dumont, 2009). However, this particular study did not validate the AMS-C for use within a South African sample but only focused on the reliability of the items included in the study (Petersen et al., 2009).

Although the aforementioned studies address aspects of motivation concerning academic performance, the need persists for South African HEIs to acquire a valid and reliable measure that encompasses the entirety of academic motivation and its effect on students' academic performance (South Africa, DHET, 2014; Köseoğlu, 2013). This is important in order to accurately determine the different motivation levels of first-year university students, specifically because students experience many challenges during their first year at university and are at risk of decreased academic motivation (South Africa, DHET, 2014; Köseoğlu, 2013; Tinto, 2001). The present study proposed that within the South African context, the AMS-C would be a valuable measure for students' academic motivation. The AMS-C has been described by, Stover et al. (2012) as a measuring instrument with extraordinary fundamental and psychometric properties that provide researchers with coherent and consistent results, regarding academic motivation. The use of the AMS-C also allows the researcher to differentiate appropriate associations between academic motivation and other educational variables (Stover et al., 2012).

To date, the AMS-C has been validated for students attending HEIs in countries including Canada, England and the United States of America (USA) (Baker, 2004; Cokley, 2000; Cokley, Bernard, Cunningham & Motoike, 2001; Vallerand et al., 1993). It was further applied to evaluate the academic motivation of Portuguese students (Lopes et al., 2018) and tested for its cross-cultural factorial validity among students in the USA and Ghana (Osei Akoto, 2014). However, no studies could be found that tested the psychometric properties of the AMS-C for South African university students. To address this gap, the current study investigated the psychometric properties of the AMS-C and determined if it is satisfactory for use within a South African sample of first-year university students. The primary objective of this study was considered important and, therefore specified to validate the AMS-C in a sample of South African first-year university students. The validity of a measuring instrument refers to 'what the test measures and how well it does so' (Foxcroft & Roodt, 2013). The validity of a measuring instrument is therefore of great significance as it determines the accuracy with which findings were applicable and represented. This study thus focused on the factorial validity, convergent validity, discriminant validity as well as criterion validity of the AMS-C. Furthermore, sufficient scale reliability of the AMS-C was also determined.

1.2 RESEARCH QUESTIONS

Based on the problem statement the following research questions are formulated:

- How is academic motivation of university students conceptualised according to literature?
- Are the psychometric properties of the Academic Motivation Scale-College version satisfactory for use within a South African sample of first-year university students? More specifically, can the following aspects be determined?
  - Factorial validity
  - Scale reliability (Cronbach alpha coefficient ≥ 0.70)
  - Convergent validity
  - Discriminant validity
  - Criterion validity (predicting satisfaction with studies and self-reported academic performance)
- What recommendation can be made for future research?

1.3 EXPECTED CONTRIBUTION OF STUDY

This study could contribute to literature on students' academic motivation, thereby enhancing our understanding of this phenomenon and contribute to both the individual and the university.

1.3.1 Contribution for the individual

This study could contribute to literature on students' academic motivation, thereby enhancing our understanding of this phenomenon and contribute to both the individual and the university.

The primary purpose of the study was to validate the psychometric properties of the Academic Motivation Scale-College version (AMS-C) for use amongst South African first-year university students. The study will thus lead to information about the possible use of the AMS-C to determine different motivation levels of first-year university students, specifically because students experience many challenges during their first year at university and are at risk of decreased academic motivation. When academic motivation is measured in a valid and reliable way, students can be made aware of their motivation levels and seek assistance as an additional resource. This can empower them to not only reach their academic goals but also reach their long-term goal of graduating.

1.3.2 Contribution for the university

The findings in this study could lead to a valid and reliable measure that could aid universities in the future to accurately measure students' motivational levels. As a result, universities could gain meaningful insight into the level of motivation of their students, the antecedents of motivation, as well as how study-related outcomes are influenced. Consequently, the university could be assisted with an additional tool that could empower them to deliver more work-ready graduates to positively reinforce the country's future workforce.

1.3.3 Contribution for the industrial/organisational literature

HEIs are steadily being viewed as organisations, with their primary business focusing on students (Habib, 2016). In general, individual's performance at work and the way in which certain factors disrupt their performance, is the main focus of industrial psychology (Bisen & Priya, 2010). It is

therefore the industrial psychologist's responsibility to recognise the work environment of these institutions along with their shareholders, containing a workforce of students and academic staff. This study's findings will contribute to the existing knowledge and literature of students' academic motivation in the South African context and could furthermore aid researchers to analytically investigate these students experience of academic motivation as well as develop an increased comprehension concerning its results in varied and unvaried contexts.

1.4 RESEARCH OBJECTIVES

The research objectives are divided into general and specific objectives.

1.4.1 General objective

The general objective of this study is to validate the Academic Motivation Scale-College version in a sample of first-year university students.

1.4.2 Specific objectives

The specific objectives of this research project entail the following:

- Conceptualise students' academic motivation, according to literature.
- Determine the validity and reliability for the AMS-C in a sample of first-year university students, particularly by determining the following:
  - Factorial validity
  - Scale reliability (Cronbach alpha coefficient > 0.70)
  - Convergent validity
  - Discriminant validity
  - Criterion validity (predicting satisfaction with studies and self-reported academic performance)
- Make recommendations for future research.

1.5 RESEARCH DESIGN

1.5.1 Research method

The research method comprises of a literature review as well as an empirical study. The findings of the present study are structured in the form of a research article. The following paragraphs highlights the literature relevant to the empirical study.

1.5.2 Research approach

A quantitative research design was followed throughout the course of this research study. Quantitative research is a way of explaining specific phenomena by gathering numerical data that are analysed using mathematically based methods, in particular statistics (Aliaga & Gunderson, 2002; Muijs, 2010). To perform data collection and attainment of the research objectives for this research study, a cross-sectional research design was used. Through the use of this particular research design the researcher was able to study various groups of people within one point in time (De Vos, Strydom, Fouché & Delport, 2011; Olsen & St. George, 2004). This has proven to be an economical and time-efficient approach for this study.

1.5.3 Literature review

For purposes of this research, a thorough and scientific literature review regarding academic motivation was conducted. In order to further explore the background and the setting in which the study will occur, appropriate keywords were utilised, i.e. *academic motivation, Academic Motivation Scale-College Version, intrinsic motivation, extrinsic motivation, amotivation, factorial validity, reliability, convergent validity, discriminant validity, criterion validity, study satisfaction, academic performance, first-year,* and *university students*.

Search engines including, ERIC, SAePublications, Science Direct, PsycArticles, Google Scholar, EbscoHost, ProQuest, and Nexus were accessed through performing computer searches in order to attain relevant literature. Articles applicable to the research, published between 2000 and 2019 were

also consulted. Furthermore, older articles and book sources related to the constructs were also consulted but within certain limits as recent articles are more relevant.

Finally, specific journals were consulted seeing as they were particularly relevant to the topic of interest and are stipulated as follow: *South African Journal of Psychology; South African Journal of Science; Journal of Applied Social Psychology; Journal of the International Society for the Investigation of Stress; Basic and Applied Social Psychology; Perspectives in Education; Higher Education Research and Development; Journal of Psychology; Canadian Journal of Science, Mathematics and Technology Education; Journal of Psychoeducational Assessment; International Journal of Teaching and Learning in Higher Education; Journal of Educational Psychology; International Journal of Educational Sciences; Journal of Educational Technology and Society; Journal of Teaching in Physical Education; Journal of Southern African Studies;* and *American Journal of Theoretical and Applied Statistics*.

1.5.4 Research participants

The dissertation formed part of a larger study project. Thus, data was already gathered by commencement of dissertation. The sample comprised 611 research participants of which 394 (64.5%) were female and 217 (35.5%) were male. The greater part of the sample group was from 17 to 19 years of age (69.6%). In terms of ethnic origin, 338 (55.3%) of the participants were black, 236 (38.6%) were white, 28 (4.6%) were coloured, six (1.0%) were Indian, and one (0.2%) participant was Asian. The remaining two (0.3%) participants did not specify their ethnic groups.

Of the 611 research participants, 239 (39.1%) indicated that they spoke Afrikaans, while 111 (18.2%) participants listed Sesotho as their home language. Other languages including Setswana, isiZulu, and English, as well as other languages, accounted for the remaining 42.6% of the sample group. Most of the participants were either studying at site 2 (n = 306; 50.1%) or site 3 (n = 281; 46.0%). Most of the students were enrolled in either their first year of Economic and Management Sciences (n = 218; 35.7%), in Humanitarian studies (n = 103; 16.9%), or in Health Sciences (n = 97; 15.9%). Finally, 317 (51.9%) participants stayed off-campus, while 289 (47.3%) participants lived on-site on one of the campuses.

1.5.5 Measuring instruments

Biographical questionnaire: Participants were asked to complete a biographical questionnaire. The reason for obtaining and reporting on the participants' characteristics was to adhere to the reporting standards of the American Psychological Association (APA, American Psychological Association, 2008). To abide by the APA requirements, the main layout of this study's sample group was provided. Accordingly, this may be purposeful should future researchers attempt to generalise the findings (Gravetter & Forzano, 2012). In particular, the characteristics that were included are gender, age, home language, campus and faculty.

Academic motivation: The Academic Motivation Scale-College version (AMS-C) developed by Vallerand et al. (1992) was used to assess the academic motivation of first-year university students. The AMS-C 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 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.').

The use of the word 'college' was replaced with the term "university" to fit the South African context. Furthermore, all seven dimensions of the original scale had a Cronbach's alpha coefficient above 0.70, ranging from 0.75 to 0.82 (Vallerand et al., 1992).

Satisfaction with studies: Students' satisfaction with their 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).

Academic performance: Participants were asked to provide two self-reported indications of their academic performance:

- Academic average – (an overall average including all subjects); and
- Main average – (an overall average including the participants' main subjects).

1.5.6 Research procedure

The data proposed for use in this study were gathered through a web-based survey as part of the larger StudyWell project. A secure hyperlink was then assigned to the particular HEI's online platform. The researcher ensured that prior to inviting students for voluntary participation, awareness was created about the study. This was accomplished by having research assistants host awareness gatherings in the associated classes on all the different sites of the HEI. All the appropriate information regarding the purpose and intentions of the study and informed consent was incorporated and explained in these gatherings. Participants also had to fill out an electronic informed consent form, which assured them of their confidentiality and emphasised that their participation in this research study is voluntary. In addition, a summarised version of all the aspects discussed in the awareness sessions was included. It was expected that it would take participants approximately 15-20 minutes to complete the survey. Once all the data were gathered, the capturing and statistical analysis thereof began in an attempt to reach the intentions set out for this study.

1.5.7 Statistical analysis

A confirmatory factor analysis (CFA) was used to determine the factorial validity. CFA is about hypothesis testing (Hurley et al., 1997), thus it was used to validate the theoretical assumptions fundamental to the scale. Based on the findings of previous validation studies reported in literature (Baker, 2004; Cokley, 2000; Cokley, Bernard, Cunningham, & Motoike, 2001; Lopes et al., 2018; Osei Akoto, 2014; Vallerand et al., 1993) two models were tested, including 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, which comprises extrinsic motivation, intrinsic motivation and amotivation).

The intent of the CFA was to determine the fit of the specified models to the data. Specific fit indices were applied to test the models' goodness of fit including traditional chi-square ($\chi 2$) 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, a cut-off value below the threshold of 0.08 indicated a good model fit (Browne & Cudeck, 1993). A cut-off value of 0.05 was considered acceptable for the SRMR (Hu & Bentler, 1999). The reliability of the data will also be investigated by calculating Cronbach's alpha coefficients. These cut-off values should, however, only be considered as guidelines as there is little concurrence regarding the values for goodness of fit (Lance, Butts & Michels, 2006).

For convergent validity, 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). Subsequently, the correlation matrix was examined to identify how the three AMS-C factors are moderately related to each other. The correlation coefficients, where effect sizes are used to generate the practical significance of the results, were also 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) are the cut-off points that were used 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. CFA was also used to compare measurement models where the correlations between the factors of interest are constrained

to 1.00. Furthermore, 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 will be tested. At present, the researcher included regression paths using the final measurement instrument. In this investigation, the standardised beta coefficient values (β) and the significance (statistical significance level for all parameters in the model will be set at $p \leq 0.05$) 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 by the researcher.

1.5.8 Ethical considerations

The current study forms part of an existing research project with the following available ethics number assigned by the relevant HEI committee: NWU-HS-2014-0165. Thus, to successfully realise the different objectives of this study as well as to ensure that research is completed in an impartial and ethical manner, all research attempts considered the following important factors (Salkind, 2009):

- *Informed consent* – Participants were fully informed about the purpose of the study as well as the nature of their participation in the study, in order to avoid misleading participants (Strydom, 2011). Participants was also asked to complete an electronic informed consent form, which assured them of their confidentiality and emphasised that their participation in this research study is voluntary. A summarised version of all the aspects discussed in the awareness sessions was also included.
- *Voluntary participation* – Participants were informed that if they wish to withdraw at any stage of the research, they have the right to do so and their responses would be kept confidential (Leedy & Ormrod, 2010). Thus, the researcher ensured participants that the research is voluntary and obtained voluntary informed consent of participants (Struwig & Stead, 2013).
- *Doing no harm* – The researcher ensured that participants were not deceived in an unethical manner in any way. In doing so, the researcher upheld their rights and dignity as well as ensured that no harm was done to any participant (Salkind, 2009; Struwig & Stead, 2013).
- *Confidentiality* – The participants' responses to the survey are being kept confidential with the use of a password-protected computer that only the researcher and the relevant project manager

(supervisor) can access (Jackson, 2011). This ensures that the privacy of participants is preserved (*preserving of privacy*).

1.6 OVERVIEW OF CHAPTERS

The results of the research objectives are presented in the form of a research article in Chapter 2. The conclusions, limitations and recommendations of the research are also discussed in Chapter 3.

1.7 CHAPTER SUMMARY

This chapter presented the problem statement, research questions and research objectives. The study design, measuring instruments and statistical analysis used were also explained, followed by a brief overview of the chapters that follow and outline the mini-dissertation.

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CHAPTER 2

RESEARCH ARTICLE

The psychometric properties of the Academic Motivation Scale-College version of South African first-year university students

ABSTRACT

Orientation: The academic motivation of students has increasingly become a topic of interest over the past decade in Higher Education Institutions. In the present study the focus was specifically on the academic motivation of first-year university students within the South African context.

Research purpose: The purpose was to examine the psychometric properties of the Academic Motivation Scale-College version for students studying within the South African higher education context.

Motivation for the study: The primary motivation for validating the Academic Motivation Scale-College version was to gain information regarding students' academic motivation for both first-year students as well as Higher Education Institutions.

Research design, approach, and method: A cross-sectional design was followed, in this validation study which permitted the gathering of quantitative data. Overall, a research sample (N = 611) of students in their first year of academic studies at a Higher Education Institutions, consisting of different campuses, was included. This validation study utilised a variety of statistical techniques such as; factorial validity, reliability, convergent, discriminant, and criterion validity.

Main findings: A seven-factor model and a three-factor model were tested. Both models showed acceptable fit. However, very high intercorrelations were found between some of the subscales of the seven-factor measurement model. Based on these results, it seemed that a three-factor model should be preferred above the seven-factor model. Three independent academic motivation factors were found and were termed intrinsic motivation, extrinsic motivation and amotivation. The Academic Motivation Scale-College version three-factor model further showed acceptable levels of factorial validity, reliability, convergent and discriminant validity. Lastly, it was also established that academic motivation significantly predicted students' satisfaction with their studies as well as academic performance.

Practical implications: The findings made available essential insight into Higher Education Institutions by providing a validated motivation scale, which can be employed to assess student academic motivation behaviours.

Contribution/Value-add: The present research study adds to the available limited research regarding the measuring of academic motivation for students studying at Higher Education Institutions in South Africa by providing a valid and reliable scale. By providing the validated scale on academic motivation, it could assist with the exploration of students' academic motivation, specifically within the Higher Education Institutions.

Keywords: Academic motivation, Academic Motivation Scale-College Version, intrinsic motivation, extrinsic motivation, amotivation, factorial validity, reliability, convergent validity, discriminant validity, criterion validity, study satisfaction, academic performance, first-year university students.

INTRODUCTION

In an attempt to address previous inequality, promoting of uniformity in South Africa has led to a rapid increase in the number of students matriculating and gaining access to South African universities (Strydom, Mentz & Khu, 2010). However, South African universities have one of the lowest graduation rates in the world – 15% compared to the international norm of 25% for students in three-year degree programmes in contact education (South Africa, Department of Higher Education and Training, DHET, 2014). Additionally, Higher Education South Africa (HESA) reported that 35% of first-year students' drop out in their first year of study (as cited in Strydom et al., 2010). Higher education is a key driver for modernisation and development especially in an economy that continues to develop around knowledge, skills and information-based activities (Boyles, 2012; Teferra & Altbachl, 2004). Teferra and Altbachl (2004) stated that as the twenty-first century is continually being recognised as the knowledge era, Higher Education Institutions (HEIs) are central to the future. The case for HEIs was specifically argued for the future of Africa – in order to succeed economically, culturally, and politically, the tertiary education sector should be resilient (Teferra & Altbachl, 2004).

HEIs in South Africa are confronted with tremendous challenges, including an increasing demand for student access, successful student success rates as well as addressing serious drop-out rates (South Africa, DHET, 2014). HEIs are also generally not adequately equipped with warning systems or methods to proactively identify at-risk students (South Africa, DHET, 2014). Challenges that, specifically, contribute to the high dropout rate of first-year students include not being prepared for the sudden transition from high school to university, emotional vulnerability, academic demands, social adjustments, lack of sufficient finances and support, and living conditions (Darling, McWey, Howard & Olmstead, 2007; South Africa, DHET, 2014; Fairbrother & Warn, 2003; Misra, Mckean, West & Russo, 2000; Murray, 2014). As a result of these challenges, the initial university performance of 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). Additional factors that might compromise the ability of students to achieve academic success include the relationship between the student and the academic institution, the students' self-awareness of their learning ability as well as students' test and academic competence (Borkowski, Carr, Rellinger, & Pressley, 1990; Fraser & Killen, 2005; Meltzer & Montague, 2001; Pressley, Borkowski, Forrest-Pressley, Gaskins, & Wile, 1993; Sansgiry, Bhosle & Sail, 2006; Lee Swanson & Hoskyn, 1999; Wong, 1991). Moreover, studies have also noted that students' self-efficacy, determination and socio-psychological factors are all significant contributors

to the academic success of students (Fraser & Killen, 2005; Malefo, 2000; McKenzie & Schweitzer, 2001; Meltzer, Katzir-Cohen, Miller & Roditi, 2001; Nicholls, 1978; Thatcher, Fridjhon & Cockcroft, 2007).

Among the factors contributing to student success, one of the most important is considered to be academic motivation (Sikhwari, 2014; Vallerand et al., 1992). Academic motivation can be strongly related to different levels of students' academic performance as it describes the differences in the amount of effort that students are willing to apply to their studies (Entwistle, 1988). Academic motivation is, therefore, 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 (DiPerna & Elliott, 1999; Jones, 2009; Schunk, Pintrich & Meece, 2008). A study conducted among South African HEIs by Fraser and Killen (2005) found that both students and lecturers described academically motivated students as effective, meticulous, driven, focused, well-prepared and knowledgeable. Accordingly, students who are academically motivated experience feelings of satisfaction, competence, 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, will often doubt their ability to succeed academically and doubt their intentions for pursuing a tertiary education (Fraser & Killen, 2005; Legault, Green-Demers & Pelletier, 2006).

Interest in the topic of motivation has escalated since the twentieth century with many theories clarifying motivation. Of these theories the most frequently used is the Self-determination Theory, developed by Deci and Ryan (1985). According to the Self-determination Theory people have a natural need for stimulation and learning from a young age (Deci & Ryan, 1985). Ryan and Deci (1985, 1991) categorise behaviour as being either intrinsically motivated, extrinsically motivated or amotivated. Intrinsic motivation is defined as the doing of an activity not for the few dissociable consequences, but the inherent satisfaction thereof (Ryan & Deci, 2000a). Contrary to intrinsic motivation, extrinsic motivation is defined as the completing of an activity to realise some dissociable outcomes (Ryan & Deci, 2000b). Amotivation is defined as a lack of intention to act or the absence of motivation (Ryan & Deci, 2000b; Köseoğlu, 2013). Based on the categorisation of motivational behaviour by Deci and Ryan (1985), 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 was originally established in French (Vallerand, Blais, Brière & Pelletier, 1989). It was later translated into English and its psychometric properties proved to be

satisfactory (Vallerand et al., 1992; Vallerand et al., 1993). The AMS-C measures three types of motivation as mentioned above: intrinsic motivation, extrinsic motivation and amotivation (Vallerand et al., 1992).

To date, the AMS-C has been validated for students attending HEIs in countries including Canada, England and the United States of America (USA) (Baker, 2004; Cokley, 2000; Cokley, Bernard, Cunningham & Motoike, 2001; Vallerand et al., 1993). It was further used to assess the academic motivation of Portuguese students (Lopes et al., 2018) and tested for its cross-cultural factorial validity among students in the USA and Ghana (Osei Akoto, 2014). A South African study exploring the pathways taken by adjustment and other psychological variables such as academic motivation, included several items from the AMS-C (Petersen, Louw & Dumont, 2009). However, this particular study did not validate the AMS-C for use within a South African sample but only focused on the reliability of the items they used (Petersen et al., 2009). 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 (e.g. USA) 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). Despite the fact that the AMS-C is widely used in international studies as mentioned above, no studies could be found that tested the psychometric properties of the AMS-C for South African university students.

Considering the abovementioned discussion, it is important to have a valid and reliable instrument that measures the entirety of academic motivation and its effect on students' academic performance (South Africa, DHET, 2014; Köseoğlu, 2013). This is specifically important for first-year students in South Africa, as they experience a tremendous amount of challenges throughout their first year at university and have the risk of decreased academic motivation (South Africa, DHET, 2014; Köseoğlu, 2013; Tinto, 2001). Therefore, the objective of the present study is to validate the AMS-C for use among first-year students in the South African context. This study aims to test the factorial validity, reliability as well as the convergent, discriminant, and criterion validity of the AMS-C.

LITERATURE REVIEW

The Academic Motivation Scale-College version

The Self-determination Theory, developed by Deci and Ryan (1985), is one of the most frequently used theories to explain motivational behaviour. According to this theory, individuals have an active need for psychological growth and assimilation (Ryan & Deci, 2002a). This active need is endowed with a natural determination of individuals to exercise and expand their interests (Ryan & Deci, 2002a). Furthermore, people possess a biological drive towards challenges to discover new perspectives and to actively internalise and develop cultural practices (Ryan & Deci, 2002a). The Self-determination Theory therefore addresses fundamental issues, including motivational behaviour (Deci & Ryan, 2008). The theory does not focus on the amount of motivation individuals possess but rather highlights the different types of motivation (Deci & Ryan, 2008).

The Self-determination Theory categorises motivational behaviour as either being, intrinsically motivated, extrinsically motivated or amotivated (Ryan & Deci, 1985, 1991). The Academic Motivation Scale-College version (AMS-C) was developed by Vallerand et al. (1992, 1993), a measure of college students' academic motivation in education, based on the categorisation of the Self-determination theory. It was then translated into English as it was originally established in French; its psychometric properties proved to be satisfactory (Vallerand et al., 1989; Vallerand et al., 1992; Vallerand et al., 1993). Three types of motivation are measured by the AMS-C as mentioned above: intrinsic motivation, extrinsic motivation and amotivation (Vallerand et al., 1992).

Intrinsic motivation

Intrinsic motivation refers to the doing of an activity for the certain joy and satisfaction derived from it (Deci, 1975; Deci & Ryan, 1985). An example of intrinsic motivation is a student who enjoys a class and learning about a specific subject and therefore attends the class for the certain joy and satisfaction thereof (Vallerand et al., 1992). The AMS-C measures intrinsic motivation with the following subscales (Vallerand et al., 1992; Stover, De La Iglesia, Boubeta & Liporace, 2012):

- Intrinsic motivation – to know: when a task or subject is carried out for the pleasure of obtaining the knowledge;
- Intrinsic motivation – towards accomplishment: when satisfaction is derived from generating products or when one's personal limits are superseded; and
- Intrinsic motivation – experienced stimulation: when activities are developed to discover pleasing aesthetics, intellectual or sensorial sensations.

Extrinsic motivation

In contrast, extrinsic motivation refers to the doing of an activity as a *means to an end* or the participation in an activity to obtain rewards (Vallerand et al., 1992). An example of extrinsic motivation is a student that studies hard to obtain a good grade – behaviour itself is therefore driven by rewards external to the behaviour (Köseoğlu, 2013). The AMS-C measures extrinsic motivation with the following subscales (Vallerand et al., 1992; Stover et al., 2012):

- Extrinsic motivation – identified: when choices are driven by extrinsic motives;
- Extrinsic motivation – 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
- Extrinsic motivation – external regulation: when behaviours are driven by others in an attempt to avoid punishment or to receive a reward.

Amotivation

Amotivation refers to the absence of motivation – where the lack of a contingency exists between one's behaviour and the outcomes thereof (Barkoukis, Tsorbatzoudis, Grouios & Sideridis, 2008; Ryan & Deci, 2000b; Köseoğlu, 2013). An example of amotivation is a student who questions the purpose of studying daily (Vallerand et al., 1992). The AMS-C measures amotivation as a single dimension measured by four items.

Validity and reliability of the AMS-C

The AMS-C has been validated for students in HEIs in several countries, including Canada, England and the United States of America (USA) (Baker, 2004; Cokley, 2000; Cokley et al., 2001; Vallerand et al., 1993). It was further used to assess the academic motivation of Portuguese students (Lopes et al., 2018) and tested for its cross-cultural factorial validity among students in the USA and Ghana (Osei Akoto, 2014). Although a study could be found that tested the *reliability* of some of the items of the AMS-C for a South African sample, no studies could be found that tested the psychometric properties of the AMS-C in its entirety for use among South African university students (Petersen, Louw & Dumont, 2009).

Promising results were found regarding the validity and reliability of the AMS-C in the above-mentioned studies. These aspects are discussed below.

Factorial validity and reliability

With regard to the factorial validity of the AMS-C, the validity of the initial seven-subscale structure in French and then English was tested, and satisfactory levels of internal consistency and temporal stability were found (Vallerand et al., 1989; Vallerand et al., 1992). In addition, the concurrent and factorial validity of the AMS-C was established in 1993 when the authors re-examined the concurrent and factorial validity among junior college students in Canada (Vallerand et al., 1993). Some support for the seven-subscale structure was established among a sample of students in the USA, in a study conducted by Cokley et al. (2001). A more recent study conducted among a sample of undergraduate students in Britain, found that the broader three-factor structure (including *intrinsic motivation*, *extrinsic motivation*, and *amotivation*), was 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, for purposes of this study it was expected that a three-factor structure will be a significantly better fit to the data compared to a seven-factor structure.

H1: Academic motivation comprises of a three-factor structure.

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 ranged from 0.83 to 0.86. With 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 proved to be satisfactory, with Cronbach's alpha coefficients ranging from 0.65 to 0.77 (Osei Akoto, 2014). It was therefore expected that the AMS-C will be a reliable measurement instrument ($\alpha \geq 0.70$ for the different factors).

H2: The three factors of the Academic Motivation Scale-College version (AMS-C) will be reliable ($\alpha \geq 0.70$).

Convergent validity and discriminant validity

Convergent validity tests if "constructs that are anticipated to be related is, in fact, related"; whereas discriminant validity tests if "constructs that should have no relationship, do not have any relationship" (Shuttleworth, 2009, para. 1). The current study examined if 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 (i.e. medium = $r \geq 0.30$; large = $r \geq 0.50$) thereof (Cohen, 1988). The following hypotheses can therefore be formulated:

H3: The three AMS-C factors are moderately related to each other and will demonstrate convergent validity.
H4: 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 as to predict future results (Fraenkel, Wallen & Hyun, 1993). Referring to the criterion validity of the AMS-C there are many factors relating to academic motivation. Some of these include academic self-concept, learning strategies, determination to complete studies, the amount of effort students are willing to apply to their studies, interest, attitude, as well as purpose (DiPerna & Elliott, 1999; Entwistle, 1988; Jones, 2009; Schunk,

Pintrich & Meece, 2008; Sikhwari, 2014; Watson, Mcsorely, Foxcroft & Watson, 2004). 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.

Satisfaction with studies

Students' satisfaction with their studies is the result of students' interactions with HEIs as an outcome of the opportunities and experiences of the subject, study course, or study programme (Stukalina, 2014). 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 (i.e. facilitate or discourage intrinsic and extrinsic motivation) includes 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. For example, students are more likely to be satisfied with their studies when they can freely choose to pursue an academic activity of their choice (autonomy), when they master the course/module (competence), and when they feel connected and supported by important individuals, such as lecturers or fellow students (relatedness) (Zhang et al., 2011).

The concepts of autonomy, competence and relatedness can further be linked to the different constructs of motivation proposed by Deci and Ryan (1985). Regarding motivational orientation, research has proposed that two types of motivation underlie university students' academic efforts (Ryan & Deci, 2000b). Intrinsic motivation encourages individuals to perform related activities and is linked to individuals' emotion, intuition and determination. Intrinsic motivation is also referred to as 'free choice', which can be directly related to autonomy (Ryan & Deci, 2000b; Zhang et al., 2011). On the other hand, extrinsic motivation drives individuals to show certain behaviour and is stimulated by external stimuli as well as purposes and incentives of external circumstances (Deci & Ryan, 1985; Stukalina, 2014). Although extrinsic motivation varies in its relation towards autonomy, it is also referred to as the doing of an activity for external gain, which can also be directly related to competence as well as relatedness (Deci & Ryan, 1985; Stukalina, 2014). Consequently, as stated above, academically motivated students experience feelings of satisfaction, competence, stimulation and pursue activities that provide rewards (Köseoğlu, 2013; Vallerand et al, 1992). Based on this, the following hypothesis can therefore be formulated:

H5: Academic motivation will be significantly and positively related to satisfaction with studies.

Academic p*erformance*

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, predicts students' academic performance. Therefore, the current study argues that academic motivation can be viewed as a precursor for students' satisfaction with their studies as well as students' self-rated academic performance. The following hypothesis can therefore be formulated:

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

RESEARCH DESIGN

Research approach

A quantitative research design was followed throughout the course of this research study. A quantitative approach is described as explaining specific phenomena by gathering statistical data that are analysed using mathematically based methods (Aliaga & Gunderson, 2002; Muijs, 2010). For this reason, a quantitative approach was the most appropriate. Furthermore, a cross-sectional design was utilised to perform data collection and attainment of the research objectives for the present study. Through use of a cross-sectional design it was possible to study multiple groups of people within one point in time (De Vos, Strydom, Fouché & Delport, 2011; Olsen & St. George, 2004). This proved to be an economical and time-efficient approach for the study. Considering that the hypotheses of the present study was also supported by existing theory, however limited, the study was both explanatory and confirmatory.

RESEARCH METHOD

Research participants

The target population was first-year students studying at a South African HEI, comprising of different campuses. The researcher only included students registered for their first year of study. A convenience sample method was used, and one large sample was obtained (N = 611). The total sample group was diverse in terms of age, gender, ethnicity, home language, campus site and faculty of study, as well as in terms of on-campus or off-campus living. The characteristics of the participants are summarised in Table 1 below.

Table 1

Characteristics of the total sample group's participants (N = 611)

Item	Category	Frequency	Percentage (%)
Age (in years)	17 – 19	425	69.6
	20 – 22	156	25.5
	23 – 25	20	3.3
	26 – 29	2	0.3
	30 +	2	0.3
	Missing values	6	1.0
Gender	Male	217	35.5
	Female	394	64.5
Ethnicity	Asian	1	0.2
	Black	338	55.3
	Coloured	28	4.6
	Indian	6	1.0
	White	236	38.6
	Other	2	0.3
Home Language	Afrikaans	239	39.1
	English	38	6.2
	Sepedi	29	4.7

Table 1 (continued)

Characteristics of the total sample group's participants (N = 611)

Item	Category	Frequency	Percentage (%)
	Setswana	64	10.5
	siSwati	14	2.3
	Tshivenda	9	1.5
	isiNdebele	5	0.8
	isiXhosa	27	4.4
	isiZulu	66	10.8
	Xitsonga	5	0.8
	Other	3	0.5
	Missing values	1	0.2
Site	Site 1	24	3.9
	Site 2	306	50.1
	Site 3	281	46.0
Faculty	Economic and Management Sciences	218	35.7
	Education	65	10.6
	Engineering	24	3.9
	Humanities	103	16.9
	Law	54	8.8
	Theology	4	0.7
	Natural and Agricultural Sciences	43	7.0
	Health Sciences	97	15.9
	Missing values	3	0.5
Stay On/Off Campus	Stay on-campus	289	47.3
	Stay off-campus	317	51.9
	Missing values	5	0.8

Note: The sites referred to in this table indicate the distinctive campuses of the HEI

Table 1 above shows that the sample comprised of 611 research participants of whom 394 (64.5%) were female and 217 (35.5%) were male. The larger part of the sample group was between 17 to 19 years of age (69.6%). In terms of ethnic origin, 338 (55.3%) participants were Black**,** 236 (38.6%) were White**,** 28 (4.6%) were Coloured, six (1.0%) were Indian, and one (0.2%) participant was Asian, while the remaining two (0.3%) participants did not state their ethnic groups. With regard to the 611 research participants, 239 (39.1%) indicated that they spoke Afrikaans, while 111 (18.2%) participants listed Sesotho as their home language. Other languages including Setswana, isiZulu and English accounted for the remaining 42.6% of the sample group. The majority of participants were either studying at site 2 (n = 306; 50.1%) or site 3 (n = 281; 46.0%). Most of the students were enrolled

in either their first year of Economic and Management Sciences (n = 218; 35.7%), in Humanitarian studies (n = 103; 16.9%), or in Health Sciences (n = 97; 15.9%). Lastly, 317 (51.9%) participants stayed off-campus, while 289 (47.3%) participants lived on-site on one of the campuses.

Measuring instruments

Biographical questionnaire: Participants were asked to complete a biographical questionnaire. The reason for obtaining and reporting on the participants' characteristics was to adhere to the reporting standards of the American Psychological Association, (APA, American Psychological Association, 2008). As to abide by the APA requirements, the main layout of this study's sample group was provided. Accordingly, this may be purposeful should future researchers attempt to generalise the findings (Gravetter & Forzano, 2012). In particular, the characteristics that were included are gender, age, home language, campus and faculty.

Academic motivation: The Academic Motivation Scale-College version (AMS-C) developed by Vallerand et al. (1992) was used to assess the academic motivation of first-year university students. The AMS-C 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.').

All seven dimensions of the original scale had a Cronbach's alpha coefficient above 0.70, ranging from 0.75 to 0.82 (Vallerand et al., 1992).

Satisfaction with studies: Students' satisfaction with their 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).

Academic performance: Participants were asked to provide two self-reported indications of their academic performance:

- Academic average – (an overall average including all subjects); and
- Main average – (an overall average including the participants' main subjects).

Research procedure

The data proposed for use in this study were gathered through a web-based survey as part of the larger StudyWell project. A secure hyperlink was then assigned to the particular HEI's online platform. The researcher ensured that prior to inviting students for voluntary participation, awareness was created about the study. This was accomplished by having research assistants host awareness gatherings in the associated classes on all the different sites of the HEI. All the appropriate information regarding the purpose and intentions of the study and informed consent was incorporated and explained in these gatherings. Participants also had to fill out an electronic informed consent form, which assured them of their confidentiality and emphasised that their participation in this research study is voluntary. In addition, a summarised version of all the aspects discussed in the awareness sessions was included. It was expected that it would take participants approximately 15-20 minutes to complete the survey. Once all the data were gathered, the capturing and statistical analysis thereof began in an attempt to reach the objectives set out for this study.

Statistical analysis

A confirmatory factor analysis (CFA) was used to determine factorial validity. CFA is about hypothesis testing (Hurley et al., 1997) and was used to validate the theoretical assumptions fundamental to the scale. Based on the findings of previous validation studies reported in literature, two models were tested, namely 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, namely extrinsic motivation, intrinsic motivation and amotivation).

During the CFA, the intent was to determine the fit of the specified models to the data. In order to test the models' goodness-of-fit, the following fit indices were applied: traditional chi-square ($\chi 2$) 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). However, there is little concurrence regarding the values for goodness of fit (Lance, Butts & Michels, 2006). Therefore, these cut-off points should only be considered as guidelines. 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. At present, the researcher included regression paths using the final measurement instrument. In this investigation, the standardised beta coefficient values (β) and the significance (statistical significance level for all parameters in the model will be set at $p \leq 0.05$) 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 (see Figure 1).

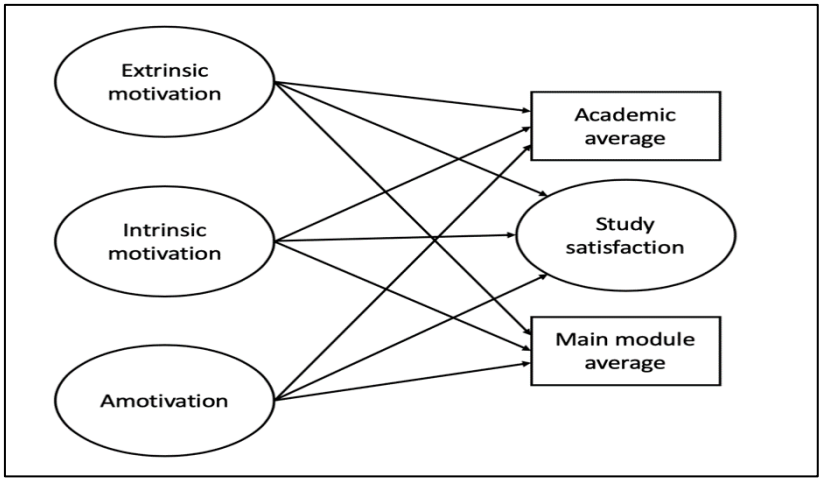

Figure 1. The structural model to test the criterion validity.

RESULTS

This section reports on the results for the factorial validity, reliability, convergent validity and discriminant validity, as well as the criterion validity of the AMS-C. The results are displayed in table format and followed by a description of the results.

To determine the factorial validity of the AMS-C, a CFA was used to test two competing measurement models based on the findings of previous validation studies described in the literature overview. 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, including extrinsic motivation, intrinsic motivation and amotivation) were tested. The results can be seen in Table 2.

Factorial validity

Table 2 below presents the results of the measurement models tested.

Table 2

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: χ2 = 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, particularly with regard to:

- 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: $p = 0.85$

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 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 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, providing evidence for Hypothesis 1.

As can be seen in Table 3 below, all of the items had statistically significant and acceptable factor loadings (λ) ranging between 0.38 and 0.92 on the respective factors. More specifically, factor loadings equal to or above 0.70 are considered high, factor loadings equal to or above 0.50 are considered medium, and factor loadings equal to or below 0.30 are considered small (Shevlin & Miles, 1998). Additionally, since the standard errors for all the items of the three factors were small, accurate estimates are assumed (Payton, Miller & Raun, 2000). Table 3 presents the standardised factor loadings for the items of the three-factor AMS-C measurement model.

Table 3

Standardised loadings for the academic motivation factors

Factor	Item	Item text	Loading	S.E.	*p*
Extrinsic motivation: External regulation	1	Because with only a high-school diploma I would not find a high-paying job later on	0.38	0.04	0.001
	2	In order to obtain a more respected job later on	0.70	0.03	0.001
	3	Because I want to have "the good life" later in my life	0.61	0.03	0.001
	4	In order to have a better salary later on	0.61	0.03	0.001
Extrinsic motivation: Identified	5	Because I think that a university education will help me better prepare for the career, I have chosen	0.76	0.03	0.001
	6	Because eventually, it will enable me to enter the job market in a field that I like	0.76	0.02	0.001
	7	Because this will help me make a better choice regarding my career after graduating	0.72	0.03	0.001
	8	Because I believe that a few additional years of education will improve my competence as a worker	0.74	0.02	0.001
Extrinsic motivation: Introjected	9	To prove to myself that I am capable of completing my university degree	0.67	0.03	0.001
	10	Because of the fact that when I succeed at university, I feel important	0.72	0.02	0.001
	11	To show myself that I am an intelligent person	0.73	0.02	0.001
	12	Because I want to show myself that I can succeed in my studies	0.75	0.02	0.001
Intrinsic motivation: Experience stimulation	13	For the passionate feelings I experience when I tell my own ideas to others	0.62	0.03	0.001
	14	For the pleasure that I experience when I learn interesting things	0.76	0.02	0.001
	15	For the pleasure that I experience when I feel excited by what I learn in my subjects	0.81	0.02	0.001
	16	For the good feeling that I experience while reading about various interesting subjects	0.80	0.02	0.001
Intrinsic motivation: Towards accomplishment	17	For the pleasure that I experience when I go beyond my limits in my studies	0.68	0.02	0.001

Table 3 (continued)

Standardised loadings for the academic motivation factors

Factor	Item	Item text	Loading	S.E.	*p*
	18	For the pleasure that I experience when I exceed my limitations	0.72	0.02	0.001
	19	Because I feel satisfied when I accomplish difficult academic activities	0.75	0.02	0.001
	20	Because my university allows me to experience personal satisfaction in my quest for excellence in my studies	0.71	0.02	0.001
Intrinsic motivation – To know	21	Because I experience pleasure and satisfaction while learning new things	0.76	0.02	0.001
	22	For the pleasure that I experience when I discover new things that I have never known before	0.74	0.02	0.001
	23	For the pleasure that I experience in broadening my knowledge about subjects that I like	0.82	0.02	0.001
	24	Because my studies allow me to continue to learn about many things that interest me	0.80	0.02	0.001
	25	Honestly, I don't know; I really feel that I am wasting my time at university	0.87	0.02	0.001
Amotivation	26	I once had good reasons for going to university; however, now I wonder whether I should continue	0.80	0.02	0.001
	27	I can't see why I go to university and to tell the truth, I couldn't care less	0.90	0.02	0.001
	28	I don't know; I can't understand what I am doing at university	0.92	0.02	0.001

For amotivation, the highest factor loading was item 4 (“I don't know; I can't understand what I am doing at university”; $\lambda = 0.92$, S.E. = 0.02); for intrinsic motivation, the highest factor loading was item 23 (“For the pleasure that I experience in broadening my knowledge about subjects that I like”; $\lambda = 0.82$, S.E. = 0.04); and for extrinsic motivation, both item 5 (“Because I think that a university education will help me better prepare for the career I have chosen”; $\lambda = 0.76$, S.E. = 0.03) and item 6 (“Because eventually, it will enable me to enter the job market in a field that I like”; $\lambda = 0.76$, S.E. = 0.02) retained the highest factor loadings. Although item 1 (extrinsic motivation: “Because with only a high-school diploma I would not find a high-paying job later on”, $\lambda = 0.38$, S.E. = 0.04) had the smallest factor loading, this loading was still considered to be acceptable.

Reliability, convergent and discriminant validity

Table 4 provides the reliabilities and correlation matrix for the latent variables.

Table 4

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 4, all the reliability coefficients were acceptable, therefore support and evidence were provided for Hypothesis 2.

The results in Table 4 show that extrinsic motivation, intrinsic motivation and amotivation all correlated with one another. The effect sizes ranged from small to large. In this regard, the correlation matrix showed that amotivation has a negative relationship with both extrinsic motivation (r = -0.23; small effect) and with intrinsic motivation (r = -0.34; medium effect). Intrinsic motivation correlated positively with extrinsic motivation (r = 0.72; large effect). 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's ≤ 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 statistical significance of the structural paths as well as the size and direction of the standardised beta coefficient values (β) were examined. The statistical significance level for all parameters was set at $p \leq 0.05$. The structural model showed an acceptable fit. The χ^2 /degrees of freedom ratio was slightly above 3 (Kline, 1998; Ivan et al., 2008). 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).

The results of the structural model are shown in Table 5 below.

Table 5

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; * = $p \leq 0.001$

The results in Table 5 show that intrinsic motivation was the strongest predictor for all three outcomes:

- Satisfaction with studies: $\beta = 0.70$, S.E. = 0.05, $p = 0.001$;
- General academic average: $\beta = 0.40$, S.E. = 0.07, $p = 0.001$; and
- Main academic average: $\beta = 0.45$, S.E. = 0.06, $p = 0.001$

Extrinsic motivation and amotivation both negatively predicted all three outcomes. Extrinsic motivation proved to be the strongest predictor for both general academic motivation (β = -0.32, S.E. = 0.07, p = 0.001) and main academic motivation (β = -0.29, S.E. = 0.07, p = 0.001). On the other hand, amotivation proved to be a slightly stronger predictor for satisfaction with studies than extrinsic motivation (β = -0.34, S.E. = 0.04, p = 0.001). These results provide partial evidence to support Hypothesis 5 and 6.

DISCUSSION

This study argued that the Academic Motivation Scale-College (AMS-C) version could be a valid and reliable instrument to measure first-year students' academic motivation. The primary purpose of the study was to validate the psychometric properties of the Academic Motivation Scale-College version (AMS-C) for use amongst South African first-year university students. The primary purpose of this study was achieved by examining the factorial validity, reliability, convergent, discriminant and predictive validity of the AMS-C.

To determine the factorial validity of the AMS-C, confirmatory factor analysis was used to test two competing measurement models based on the findings of previous validation studies described in the literature overview. A seven-factor model (specifying all seven subscales of the AMS-C) (Cokley, et al., 2001; Fairchild, Horst, Finney & Barron, 2005), and a three-factor model (specifying the three broad factors of the AMS-C, including extrinsic motivation, intrinsic motivation and amotivation; Baker, 2004; Stover, et al., 2012) were tested. At first glance, the seven-factor measurement model appeared to be a better fit compared to the three-factor model, seeing that the seven-factor model had better fit-indices. However, very high intercorrelations were found between some of the subscales of the seven-factor measurement 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 satisfactory, specifically the RMSEA value of 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."

If the wording of the items is inspected, it can be seen that these items are conceptually similar and contain similar key words (DeLisi, Hochstetler & Murphy, 2003; Anderson & Gerbing, 1984). The goodness-of-fit was improved by the above-mentioned modifications, although the RMSEA index still did not exhibited acceptable model fit (a value above 0.08 was obtained) (Browne & Cudeck, 1993; Van De Schoot et al., 2012). However, a recent study by McNeish, An and Hancock (2018) stated that, while firm cut-off values for fit indexes are often cited by Hu and Bentler in 1999, new statistical evidences and simulations have shown that these fit indices are highly influenced by measurement quality. For example, "a RMSEA value of 0.06 (conventionally thought to indicate good fit) can actually indicate poor fit with poor measurement quality (e.g., standardized factors loadings of around 0.40). Conversely, an RMSEA value of 0.20 (conventionally thought to indicate very poor fit) can indicate acceptable fit with very high measurement quality (standardized factor loadings around 0.90)" (McNiesh et al., 2018, p. 43). For this reason (and based on the fit indices of the final structural model), Hypothesis 1 was accepted.

Although the results for the factorial validity of the AMS-C are somewhat ambivalent in this study (given somewhat support for the seven-factor and three-factor measurement models), the results are in line with other studies that found support for a seven-factor model (Cokley et al., 2001; Fairchild et al., 2005) as well as a three-factor model (Baker, 2004; Stover et al., 2012). It is therefore important to note that the results in this study should be considered as preliminary findings used in a specific

sample of first-year South African students. Future studies are still needed to determine which model (seven-factor vs. three-factor) has better fit.

To determine whether the AMS-C factors were reliable, Cronbach's alpha values were calculated. The findings showed acceptable Cronbach's alpha reliability coefficients ($\alpha \geq 0.70$) for the AMS-C factors (Nunnally & Bernstein, 1994; Tabachnick & Fidell, 2001): intrinsic motivation ($\alpha = 0.92$), extrinsic motivation ($\alpha = 0.86$), and amotivation ($\alpha = 0.87$). This provided evidence for Hypothesis 2, i.e. that the scale would show acceptable reliability. The research of Vallerand et al. (1992) ($\alpha \geq 0.60 – 0.91$) as well as Fairchild et al. (2005) ($\alpha \geq 0.77$ - 0.90) found acceptable reliability results pertaining to the seven-factor model. Stover et al. (2012) ($\alpha = 0.60 – 0.81$) also found acceptable reliability results pertaining to the three-factor model.

The next objective was to determine the convergent validity of the AMS-C by investigating the relationship between the three AMS-C factors (i.e. intrinsic motivation, extrinsic motivation and amotivation). The correlation coefficients showed that significant relationships were found between the three academic motivation variables. Amotivation had a negative relationship with both intrinsic motivation and extrinsic motivation; intrinsic motivation had a positive relationship with extrinsic motivation; and extrinsic motivation had a positive relationship with intrinsic motivation. This provides evidence for the strength of the relationships between the academic motivation factors, supporting Hypothesis 3, i.e. convergent validity. Although, limited convergent validity evidence are reported in literature, these results are in line with Fairchild et al. (2005), who also found a significant relationship between the three AMS-C factors (Cokley et al., 2001; Vallerand et al., 1993).

This study's results were further examined to provide evidence for Hypothesis 4, i.e. discriminant validity. The results demonstrated that the AMS-C factors showed adequate validity seeing that the correlations between the academic motivation factors were within Brown's guideline of below 0.85 (Brown, 2015). These results are in accordance with Guay, Morin, Litalien, Valois and Vallerand (2015) who also determined the pattern of discriminant correlations among the AMS-C factors. Therefore, no discriminant validity issues were present in the model.

The criterion validity of the AMS-C was examined to determine whether academic motivation was a significant predictor of students' satisfaction with studies and students' self-rated academic performance. To establish criterion validity, a final structural model was created and regression paths inserted. All the regression paths within the structural model were significant. The findings showed that intrinsic motivation positively predicted students' satisfaction with their studies and both general

academic average and main academic average. Extrinsic motivation and amotivation negatively predicted all three motivation factors. The regression paths of intrinsic motivation proved to be the strongest predictor for all three outcomes, providing partial evidence for Hypothesis 5 and Hypothesis 6.

With regard to amotivation, it was expected that this factor negatively predicts students' performance and satisfaction with their studies, since amotivation refers to the lack of motivation to learn, perform, enjoy or engage in one's study course (Ryan & Deci, 2000b; Köseoğlu, 2013). Extrinsic motivation refers to the doing of an activity for some or other dissociable outcomes (Köseoğlu, 2013). Cerasoli, Nicklin and Ford (2014) found that extrinsic motivation largely predicts the quantity of an individual's work, thus an individual will only do enough to attain the external reward that is associated with the activity. As a result, students who are extrinsically motivated might perform to attain a specific reward, but their overall long-term behaviour will not change or be consistent (Afzal, Ali, Khan & Hamid, 2010). Additionally, extrinsically motivated students will ultimately not be satisfied with their studies (Soria & Stebleton, 2013). For example, a student choosing a certain major based on its projected income or their parents' desires will lead to a lack of autonomy, competence, relatedness and eventually needs to be satisfied (Deci & Ryan, 1985; Soria & Stebleton, 2013; Stukalina, 2014).

Conversely, students who are intrinsically motivated take up certain courses for their enjoyment thereof or to expand their knowledge and interests (Afzal et al., 2010). Consequently, these students' overall performance is consistent as they are truly interested in learning and achieving certain objectives (Afzal et al., 2010). Furthermore, students who are intrinsically motivated perform better and this transcends to students' satisfaction with their studies. Intrinsically motivated students who study or partake in specific tasks for the inherent joy thereof will also experience overall enjoyment and satisfaction with their studies (Chau & Cheung, 2018). Within the above discussion, it is apparent that the results obtained for criterion validity of the study is in accordance with existing literature.

In summary, the results supported a three-factor model, although future research is needed to establish the best model fit: a seven-factor measurement model vs. a three-factor measurement model. Favourable reliability scores provided evidence for the internal consistency of the AMS-C. 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.

Practical implications

The present study provides results to HEIs for a viable instrument to measure first-year students' academic motivation. 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. For instance, students can be made aware of their motivation levels and seek assistance as an additional resource. Based on the results of this study, HEIs can employ certain supporting interventions such as helping students switch to a major, they can intrinsically identify with or educating students on the benefits of being academically motivated. Participation of students should be voluntary. 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 to positively reinforce the country's future workforce.

Limitations and recommendations

Although this study has provided evidence to support its aim, it is not without limitations. More specifically, the first limitation accounts for the fact that only first-year students were included in the sample. As a result, the findings might not easily be transferred to senior students. It is therefore essential that future researchers include students from different academic year groups to further validate the findings of this study.

Secondly, the study was conducted at one specific HEI and not nationally across different institutions. These further limits the applicability of the findings of the present study. It is therefore recommended that replication studies are conducted nationally across South Africa. The findings of these studies could then serve as evidence to apply the AMS-C across HEIs in South Africa. These studies could also add to the existing literature by obtaining more knowledge about the outcomes in similar and dissimilar contexts.

Thirdly, this study made use of a cross-sectional design, which made it difficult to draw fundamental conclusions and to provide findings in a certain timeframe as chosen by the researcher (Levin, 2006). 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, a longitudinal research exploration is suggested.

Fourthly, the present study did not test for equivalence and bias. Equivalence refers to the comparability of findings across cultures, while bias refers to problematic factors, limiting the comparability of findings across cultures (Van de Vijver, 2001; Van de Vijver & Leung, 1997; Van de Vijver & Poortinga, 1997) This suggests that the findings might differ when academic motivation is investigated between different ethnic groups or between different genders. It is therefore recommended that future research examines the three academic motivation factors within different ethnic or language groups and between different genders.

Lastly, the study only included one data sample which encouraged preliminary results pertaining to the factorial validity. It was therefore necessary to apply modifications to the three-factor model to ensure a better fit. More specifically, correlating error terms between certain items were allowed. However, these correlated error terms suggest factors exist that were not specified by the measurement model (DeLisi et al., 2003; Anderson & Gerbing, 1984). It is therefore recommended that future research includes multiple samples to determine which model has a better fit. Finally, it is recommended that mixed research methods be included in future research, such as interviews, reflection diaries or focus groups to minimize the potential of measurement and non-measurement error (Dillman, Smyth & Christian, 2014).

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CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMENDATIONS

In this final chapter, conclusions are provided, drawn from the general and specific objectives of the study presented in Chapter 1. Thereafter the limitations of the study are discussed followed by recommendations for universities and future research.

3.1 CONCLUSIONS

Since the twentieth century, research in the topic of motivation has escalated especially since motivation is considered to be one of the most important contributing factors to students' academic success (Sikhwari, 2014; Vallerand et al., 1992). However, students' academic success, particularly among first-year students, is a major concern within higher education institutions (HEIs) in South Africa. Higher Education South Africa (HESA) reported that 35% of first-year students' drop out in their first year of study (as cited in Strydom, Mentz & Kuh, 2010). Despite these troubling statistics, no valid and reliable measures are available to determine students' academic motivation within the South African context. This study argued that the Academic Motivation Scale-College (AMS-C) version could be a useful measure of first-year students' academic motivation. The AMS-C has been described as an instrument with sound theoretical and psychometric properties that permits a valid and reliable assessment of academic motivation (Stover, De la Iglesia, Boubeta & Liporace, 2012). The AMS-C has been validated in various countries, although not in South Africa. It is challenging to transfer psychometric instruments across cultures without revalidating an instrument (De Klerk, Boshoff & Van Wyk, 2009). Therefore, the general objective of the present study was to validate the AMS-C in a sample of first-year university students.

The first objective of the study was to conceptualise students' academic motivation, according to literature. Academic motivation was, therefore, conceptualised as students' 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 (DiPerna & Elliott, 1999; Jones, 2009; Schunk, Pintrich & Meece, 2008). Academically motivated students are generally characterised as effective, meticulous, driven, focused, well-prepared and knowledgeable. As a result, academically motivated

students experience feelings of satisfaction, competence, stimulation and pursue rewarding activities (Köseoğlu, 2013; Vallerand et al, 1992).

Accordingly, the Self-determination Theory, developed by Deci and Ryan (1985), explains that people are naturally motivated to develop themselves intellectually. Ryan and Deci (1985, 1991) categorise behaviour as being either intrinsically motivated, extrinsically motivated or amotivated. Based on this categorisation of motivational behaviour, Vallerand et al. (1992, 1993) developed the AMS-C. Therefore, the AMS-C measures three types of academic motivation: intrinsic motivation, extrinsic motivation and amotivation (Vallerand et al., 1992):

- ***Intrinsic motivation*** refers to the doing of an activity for the certain joy and satisfaction derived from it (Deci, 1975; Deci & Ryan, 1985). An example of intrinsic motivation is a student that enjoys a class and learning about a specific subject and therefore attends the class for the certain joy and satisfaction thereof (Vallerand et al., 1992).
- ***Extrinsic motivation*** refers to the doing of an activity as a *means to an end* or the participation in an activity to obtain rewards (Vallerand et al., 1992). An example of extrinsic motivation is a student that studies hard to obtain a good grade – behaviour itself is therefore driven by rewards external to the behaviour (Köseoğlu, 2013).
- ***Amotivation*** refers to the absence of motivation where the lack of contingency exists between one's behaviour and the outcomes thereof (Barkoukis, Tsorbatzoudis, Grouios & Sideridis, 2008; Ryan & Deci, 2000; Köseoğlu, 2013). An example of amotivation is a student who questions the purpose of studying daily (Vallerand et al., 1992). The AMS-C measures amotivation as a single dimension measured by four items.

The second objective of the study was to determine the validity and reliability for the AMS-C in a sample of first-year university students. To achieve this, the study aimed at providing statistical evidence by investigating the following psychometric properties: factorial validity, scale reliability, convergent, discriminant and criterion validity of the AMS-C.

Firstly, the *factorial validity* of the AMS-C was investigated. A CFA was used to test two competing measurement models based on the findings of previous validation studies described in Chapter 2. A seven-factor model (specifying all seven subscales of the AMS-C) (Cokley, Bernard, Cunningham & Motodike, 2001; Fairchild, Horst, Finney & Barron, 2005), and a three-factor model (specifying the

three broad factors of the AMS-C, including extrinsic motivation, intrinsic motivation and amotivation) were tested (Baker, 2004; Stover et al., 2012). At first glance, the seven-factor measurement model appeared to be a better fit compared to the three-factor model, considering that the seven-factor model had better fit-indices. However, very high intercorrelations were found between some of the subscales of the seven-factor measurement model. These variables were correlated and resulted in the alternative three-factor model (Kline, 2005). This indicates that intrinsic motivation, extrinsic motivation and amotivation are three independent factors. However, the fit indices of the alternative three-factor model were also problematic (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. The modification indices were applied to these pairs of error terms, as these items are conceptually similar and contain similar key words (DeLisi, Hochstetler & Murphy, 2003; Anderson & Gerbing 1984).

After these error terms were allowed to correlate, the three-factor model was improved. 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 (Byrne, 2001; Hoyle, 1995), although the RMSEA was still 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

The results for the factorial validity of the AMS-C were somewhat ambivalent in this study (given somewhat support for both the seven-factor and three-factor measurement models). The fit of both these models are in line with other studies that found support for a seven-factor model (Cokley et al., 2001; Fairchild et al., 2005) as well as a three-factor model (Bakker, 2004; Stover et al., 2012). It is therefore important to note that the results in this study should be considered as preliminary findings used in a specific sample of first-year South African students. Future studies are still needed to determine which model (seven-factor vs. three-factor) has better fit.

To calculate whether the AMS-C factors were *reliable*, Cronbach's alpha values were calculated. The findings showed acceptable Cronbach's alpha reliability coefficients ($\alpha \geq 0.70$) for the three AMS-C factors (Nunnally & Berstein, 1994; Tabachnick & Fidell, 2001): intrinsic motivation ($\alpha = 0.92$), extrinsic motivation ($\alpha = 0.86$), and amotivation ($\alpha = 0.87$). The research of Vallerand et al. (1992) ($\alpha \geq 0.60 – 0.91$) as well as Fairchild et al. (2005) ($\alpha \geq 0.77$ - 0.90) found acceptable reliability results

pertaining to the seven-factor model. Stover et al. (2012) ($\alpha = 0.60 – 0.81$) also found acceptable reliability results pertaining to the three-factor model.

To determine the *convergent validity* of the AMS-C, the relationship between the three AMS-C factors was investigated (i.e. intrinsic motivation, extrinsic motivation and amotivation). The correlation coefficients showed that significant relationships were found between the three academic motivation variables. Amotivation had a negative relationship with both intrinsic motivation and extrinsic motivation. Intrinsic motivation had a positive relationship with extrinsic motivation. Extrinsic motivation had a positive relationship with intrinsic motivation. This provides evidence for the strength of the relationships between the academic motivation factors. Although limited convergent validity evidence is reported in literature, these results are in line with Fairchild et al. (2005), who also found a significant relationship between the three AMS-C factors (Cokley et al., 2001; Vallerand et al., 1993).

Fourthly, the *discriminant validity* was tested. The results showed that the AMS-C factors showed adequate validity seeing that the correlations between the academic motivation factors were within Brown's guideline of below 0.85 (Brown, 2015). These results are in accordance with Guay, Morin, Litalien, Valois and Vallerand (2015) who also determined the pattern of discriminant correlations among the AMS-C factors. Therefore, no discriminant validity concerns were present in this study.

Lastly, the *criterion validity* of the AMS-C was tested to determine whether academic motivation was a significant predictor of students' satisfaction with studies and students' self-rated academic performance. To establish criterion validity, a final structural model was created, and regression paths inserted. All the regression paths within the structural model were significant. The findings showed that intrinsic motivation positively predicted students' satisfaction with their studies and both general academic average and main academic average. Extrinsic motivation and amotivation negatively predicted all three of the academic motivation factors.

In summary, the results supported a three-factor model, although future research is needed to establish the best model fit: a seven-factor measurement model vs. a three-factor measurement model. Favourable reliability scores provided evidence for the internal consistency of the AMS-C. The 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.

3.2 LIMITATIONS

This study has provided evidence to support its objectives. However, it is not without limitations.

The first limitation specifically refers to the fact that only first-year students were included in the sample. Therefore, since the results only accounted for first-year students, the findings might not easily be transferred to senior students. As a result, it is essential that future researchers include students from different academic year groups to further validate the findings of this study.

The second limitation also refers to the sample study of this study. This study only included one data sample which prompted preliminary results concerning factorial validity. It was therefore necessary to investigate modification indices to ensure a better fit. Correlating error terms between certain items were specifically allowed. These correlated error terms of items suggest factors exist that were not specified by the measurement model. This could mask an alternate, more meaningful structure (DeLisi et al., 2003; Anderson & Gerbing, 1984). It is recommended that future researchers include multiple samples to determine which model has a greater fit: a seven-factor measurement model vs. a three-factor measurement model.

The third limitation is concerned with the fact that the study was conducted at one specific HEI and not nationally across different institutions. This further limit the relevance of the findings of the present study. It is recommended that replication studies are conducted nationally across South Africa. The findings of these studies could then serve as evidence to apply the AMS-C across South Africa. This could add to the existing literature by obtaining more knowledge about the outcomes in varied and unvaried contexts.

The fourth limitation pertains to the design of this study. The present study made use of a cross-sectional design, which made it difficult to derive fundamental conclusions as well as providing findings in a certain timeframe as chosen by the researcher (Levin, 2006). 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, it is suggested to make use of a longitudinal research exploration.

The fifth and final limitation of this study explains that the present study did not test for equivalence and bias. Equivalence refers to the comparability of findings across cultures, while bias refers to problematic factors, limiting the comparability of findings across cultures (Van de Vijver, 2001; Van de Vijver & Leung, 1997; Van de Vijver & Poortinga, 1997). This suggests that the findings might differ when academic motivation is investigated between different ethnic groups or between different genders. Therefore, future research might examine the three academic motivation factors within different ethnic groups and between different genders, to test for equivalence and bias.

3.3 RECOMMENDATIONS

Apart from these limitations, the present study suggests valuable findings regarding the measurement of academic motivation within HEIs in the South African context. It is also important to note that recommendations are presented for the practical use and application of the AMS-C by HEIs as well as for future research to be conducted.

3.3.1 Recommendations for universities

The present study provides results to HEIs for a practical instrument to measure first-year students' academic motivation. It is recommended that HEIs make use of the AMS-C 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 at risk of decreased academic motivation. These assessments could take place at the beginning of the year and again at the end of the year, to be able to evaluate whether students academic motivation increased or decreased. Furthermore, HEIs are encouraged to use instruments like the AMS-C to proactively identify students at risk and make available supporting interventions. For instance, students can be made aware of their motivation levels and seek assistance as an additional resource. Based on the results of this study, HEIs can employ certain supporting interventions such as:

- Providing individual, social and academic support to at-risk students.

- Helping students switch to a major with which they experience a natural connection.
- Educating students on the benefits of being academically motivated.

These supporting interventions can empower students to not only reach their academic goals but to also reach their long-term goal of graduating. In conclusion, the universities are supported by an additional tool that empower them to deliver more work-ready graduates to positively reinforce the country's future workforce.

Lastly, it is recommended that the university use the AMS-C to specifically identify first-year students at risk of dropping out. For example, the university could employ a programme to measure the academic motivation of first-year students on a quarterly basis. If an at-risk student or group of students is identified, the measures can be used to determine which intervention would be the best course of action or most effective. Regarding the student or group of students identified, the university can work in union with either the student bodies, house committees of residential hostels or student counselling and development services available on campus facilitated by professionally trained and registered counsellors or psychologists. This union between the university and the various support structures available on campus can provide students with several support interventions that are in line with their needs.

3.3.2 Recommendations for future research

For future research it is recommended that researchers include students from different academic year groups to further validate the findings of this study. Additionally, regarding the sample of the present study it is recommended that future studies include multiple samples to determine which model, a seven-factor measurement model vs. a three-factor measurement model, has a greater fit, specifically because this study only included one data sample which prompted preliminary results concerning factorial validity.

Another important recommendation includes testing for equivalence and bias, considering that equivalence and bias accounts for comparability of findings across cultures, as well as for problematic factors, limiting the comparability of findings across cultures (Van de Vijver, 2001; Van de Vijver & Leung, 1997; Van de Vijver & Poortinga, 1997). It is therefore recommended that future research

investigates the variances between different ethnic groups or between different genders, considering that the findings might differ.

It is also important that future research completes replication studies nationally across South Africa. The findings of these studies could then serve as evidence to apply the AMS-C across South Africa. This could add to the existing literature by obtaining more knowledge about its outcomes in varied and unvaried contexts.

Making use of a longitudinal research design is also suggested, given that a longitudinal design allows the researcher to produce conclusions over an extended period of time (Badmus, Okonkwo, & Okoh, 2012). This approach is both financially and time effective and will also allow for the study to be both exploratory and confirmatory (Badmus et al., 2012). Finally, it is recommended that mixed research methods be included in future research, such as interviews, reflection diaries or focus groups, to minimize the potential of measurement and non-measurement error (Dillman, Smyth & Christian, 2014).

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