Academic performance of first-year university students: modelling the role of reading competence

González-Betancor, Sara M.[a]*; Fernández-Monroy, Margarita[b]; Galván-Sánchez, Inmaculada [c]; López-Puig, Alexis J.[d]

[a]*(Corresponding author) Departamento de Métodos Cuantitativos en Economía y Gestión, Universidad de Las Palmas de Gran Canaria (ULPGC), Las Palmas de Gran Canaria, Spain
sara.gonzalez@ulpgc.es (ORCID: orcid.org/0000-0002-2209-1922)

[b]Departamento de Economía y Dirección de Empresas, Universidad de Las Palmas de Gran Canaria (ULPGC), Las Palmas de Gran Canaria, Spain
margarita.fernandez@ulpgc.es (ORCID: orcid.org/0000-0002-4259-4703)

[c]Departamento de Economía y Dirección de Empresas, Universidad de Las Palmas de Gran Canaria (ULPGC), Las Palmas de Gran Canaria, Spain
inmaculada.galvan @ulpgc.es (ORCID: orcid.org/0000-0001-7540-1675)

[d]Agencia Canaria de Calidad Universitaria y Evaluación Educativa (ACCUEE), Gobierno de Canarias, Las Palmas de Gran Canaria, Spain
alexis.lopez@ulpgc.es (ORCID: orcid.org/0000-0002-8254-3513)

Implementation of the European Higher Education Area changed the assessment model in higher education towards a competence-based system, so that students are assessed by what they demonstrate they can do (competences). However, assessment of certain key competences, such as reading, ceases at higher education. The question remains whether reading competence continues to influence academic achievement at this level. We designed a reading comprehension test based on PISA questions and administered it to new-intake university students. The results were linked to students' grades in each first-year subject and their sociodemographic administrative data. The influence of reading competence and socioeconomic status on grades in all first-year subjects was analysed through structural equation models. The results show that reading competence at the start of university education has a direct influence on grades in all first-year subjects and an indirect influence through the admission grade. In conclusion, reading competence needs to be further developed and promoted even in the university context.

Keywords: structural equation; reading competence; academic achievement; socioeconomic status; assessment; higher education.

Introduction

Following the implementation of the European Higher Education Area (EHEA) after the Bologna Declaration on 19 June 1999, higher education institutions have been working to achieve an education system that is recognised throughout Europe. Twenty years have passed since the signing of the Declaration and the start of this process to encourage student mobility while maintaining the quality of teaching and learning and define benchmarks for the generic and specific competences of each discipline. These competences continue to be assessed within the EHEA by describing learning outcomes and providing frameworks for students to demonstrate what they "know" and "can do" throughout their learning process.

Due to the importance of competences, the Government of Spain, in its Education and Training Strategy 2020, focused Strategic Objective 2 on "Improving the quality and efficiency of education and training", based on the European Union goal of "reducing the percentage of 15-year-old pupils who perform poorly in basic competences in reading, mathematics and science to less than 15%" (European Commission, 2012). The main objective of the education system is therefore to improve individuals' basic competences. The European Union Council of Ministers establishes the benchmark as 15% in absolute terms in the three areas examined in the OECD Programme for International Student Assessment (PISA), indicating a need to reduce the number of pupils with learning gaps in reading, mathematics and science (INEE, 2013).This goal requires an in-depth analysis of competence assessment and its influence on academic performance.

Studies aimed at improving the quality of the higher education system have identified key competences in university graduate employability and emphasised the need to develop generic competences beyond the specific competences of each degree and subject (Álvarez Benítez & Asensio-Muñoz, 2020). Today, 20 years after the Bologna

Declaration, it is still difficult to find scientific evidence about the assessment of academic competences in higher education, highlighting a need for a system to record the evolution and scope of competences. At university level, there is a need for further analysis of the factors that determine academic achievement (Fenollar et al., 2007), which may explain the causes of high dropout and failure rates. A possible reason for this problem is that students may be entering university without the required preparation to succeed (Douglas, 2019). In general, academic success is a complex process involving institutional factors, such as support programmes, and student characteristics, such as demographic factors (Mills et al., 2009). According to Potts et al. (2004, p. 385), "all of the students admitted to the university have the potential to graduate, if given the "right" academic and social support structure". Hence, research in this area may lead to the design of teaching-learning activities that help retain students. Consequently, the analysis of the first-year experience contribute to identify students at risk or in need of additional support, thus facilitating the transition process and success in the first year at university (Ding & Curtis, 2021; Fokkens-Bruinsma et al., 2020).

This study addresses the importance of reading competence, defined by the OECD (2009a, p. 14) as "an individual's capacity to understand, use and reflect on written texts, in order to achieve one's goals, to develop one's knowledge and potential and to participate in society". In higher education, this definition can be extended and related to lifelong learning: reading for various purposes and developing reading strategies that include comprehension and self-regulation to enable the reader to interact and actively participate in society. Comprehension is an integral part of reading skills development, and therefore by determining the strategies that most affect students' level of comprehension and how students use such strategies with regard to their level of comprehension, we can shed light on the interrelation between comprehension and

academic achievement.

Reading literacy plays a key role in students' academic performance, although further research is needed to analyse the effect of reading comprehension level on academic achievement in the university context (Rodríguez-Hernández et al., 2020), as it seems to be a topic of interest mainly in previous educational stages (Shahaeian et al., 2018). Moreover, academic performance may be also affected by other factors such as family income, parental education and occupation, students' effort, or previous educational outcomes (Ali et al., 2013). For this reason, this study aims to improve knowledge about the academic performance of first-year university students by considering the effect of reading literacy and admission grade, taking into account the socioeconomic status. By means of structural equation estimation, we analyse the effect of the variable under study, i.e. reading literacy, on students' academic performance, both direct and mediated through the admission grade. The main contribution of this work is therefore twofold. On the one hand, the application at university level, where it has hardly been analysed. On the other hand, the proposed model itself, in which for the first time in the literature, to the best of our knowledge, an indirect effect on academic performance through the admission grade is proposed and, moreover, confirmed.

Academic performance

As a result of academic concern about the success of education policies in certain countries, various studies have assessed and analysed the importance of academic achievement as a defining factor in the effectiveness of education systems.

Academic performance is a multidimensional construct, but there is no general consensus on how to measure it. A review of the literature shows that it is a complex construct as far as its definition is concerned, and its components vary depending on the objective of

the study (González Barbera et al., 2012). It can be defined as comprising several components, which include learning processes, cognitive aspects and educational structure (Cajas Bravo et al., 2020). Thus, according to these authors, academic performance can be measured in terms of students' school marks, their level of knowledge or abilities, or the assessment of achievements in relation to the money, time and effort invested.

Additionally, emphasis has been placed on the importance of having information about students, such as their living conditions, for inclusion in studies attempting to explain first-year academic performance (Mills et al., 2009). Other authors have also highlighted the need for more-in-depth study of the competences that influence academic performance in order to provide solid evidence for indirectly improving education systems (González Barbera et al., 2012). Widely validated national and international assessments, such as the measuring instruments used in PISA and PIRLS (Progress in International Reading Literacy Study), attempt to address this issue.

In this study, the value of students' grades is taken as the measure of academic performance, assessed by the final grades achieved, referring to the assessment of learning after the academic activity in the subjects of the course.

Reading skill

Comprehending the meaning of a text is a complex cognitive activity of individuals. In this regard, reading comprehension is one of the most important human achievements associated with personal growth (Cheng & Wu, 2017). An individual's reading ability makes learning a pleasurable activity that also promotes acquisition of further knowledge, favouring the overall development of the individual (Cullinan, 2000). Reading ability can therefore significantly influence not only academic activities, but also students' personal development (Chen et al., 2018; Reed et al., 2017).

Academic success is closely related to reading proficiency, not only in primary but also in secondary education (Cullinan, 2000). The literature evidences the importance of encouraging the reading habit in primary school because of the benefits, such as improved academic performance, which children can gain through independent reading, as well as group reading (Nyarko et al., 2018). Also, at the secondary school level, various studies reported a significant relationship between reading competence and specific skills such as Mathematics and Science (Akbasli et al., 2016; Cromley, 2009). Moreover, reading efficacy and reading comprehension emerge as effective factors defining students' success not only in language arts, but also in science and mathematics (Yildiz et al., 2019). Reading comprehension is therefore a factor that can determine academic results in pre-university education and, as a result, may affect the university admission exam grade.

In the context of higher education, the value of reading is emphasized as a way of interacting with the world, being necessary to promote these skills of university students to become "competent, independent, and literate citizens" (Manarin, 2019a, p. 20). For instance, Douglas' work (2019) focuses on inspiring students to develop reading skills in the context of Literature courses in Australian higher education, with the aim to prepare them effectively for the long term, within and beyond the academy. Haught and Walls (2004) suggest that medical schools should consider using a reading index to better predict which applicants will be successful in their undergraduate studies, as reading ability, in terms of vocabulary, comprehension and rate, is one of the factors contributing to academic achievement of medical students. Bharuthram (2012) argues that universities should be committed to making students aware of the importance of reading and helping them to acquire the adequate reading practices needed at this educational level, since reading comprehension is essential for academic success.

University admission grade

Another important factor studied in relation to university students' academic performance is their admission grade (Rodríguez et al., 2019a). Several studies evidence the impact of the university admission grade on the academic performance of first-year university students (Byrne & Flood, 2008; Li & Dockery, 2014; Mills et al., 2009), as well as on long-term academic success (Geiser & Santelices, 2007; Nagy & Molontay, 2021). Mills et al. (2009) analyse 381 full-time students at the University of Western Australia and conclude that matriculation score is the strongest predictor of first-year students' academic performance, thus highlighting the importance of prior academic success. Similarly, Byrne and Flood (2008) evidence that prior academic achievement shows a significant effect on first year performance of accounting students at an Irish university. On the other hand, Geiser and Santelices (2007) examine the contribution of highschool grades and standardized tests in predicting four-year college outcomes of students at the University of California. However, Rodríguez et al. (2019a) indicate that admission grade point average is mainly associated with student performance in the first two courses, and propose other potential determinants that may be more important, such as students' motivation or maturity.

Economic, Social and Cultural Status (ESCS)

The systematic literature review by Rodríguez-Hernández et al. (2020) highlight the need for more research on the relationship between Economic, Social and Cultural Status (ESCS) and academic results in higher education (measured by achievement, competences and persistence). The review also emphasises the need to analyse this relationship in depth, with particular focus on the mediating role of earlier academic achievements. According to Sackett et al. (2012), ESCS is linked to the development of skills that are predictive of academic performance. In their study at 110 colleges and

universities in the United States, they conclude that in typical schools, low ESCS students are less likely to enrol in university, although ESCS is not a major exclusion factor in the admissions process; the origin of the relationship between ESCS and admissions test scores and secondary school grades is probably due to some combination of educational opportunity, school quality, peer effects and other social factors.

For some students, the opportunity costs of obtaining a university degree and the difficulties they must overcome to get it may exceed the benefits they will gain from attending university; thus, students' expectations for further education depend on family resources, among other factors (OECD, 2017). Therefore, the role of ESCS in university admissions continues to receive major attention (Sackett et al., 2012).

Other studies reported that family socioeconomic status is a powerful predictor of early reading development in children (Bradley & Corwyn, 2002; Cheng & Wu, 2017; Kieffer, 2010). Socioeconomic status is usually measured by the level of family income, and parental education and occupational status (Bradley & Corwyn, 2002). Parental education is positively related to reading comprehension skills (van Bergen et al., 2017). Families with higher socioeconomic status are able to give their children a richer learning environment because their greater financial, human and social resources enable them to promote more positive attitudes to reading and help their children learn (Cheng & Wu, 2017). Socioeconomic status is one of the most important factors in explaining the differences in pupils' results in PISA (Nieto Martin & Recamán Payo, 2012). In a comparative analysis of European education systems, these authors reported a significant impact of family occupational status on PISA results in reading comprehension and other competences.

Considering the arguments stated above, more research is needed to determine whether the ESCS of first-year students influences pre-university performance indicators such as

university admission grades and reading comprehension as an acquired competence.

Study objectives and hypotheses

The main objective of this study is to analyse the influence of pre-university students' reading competence on their academic performance during the first year of their university studies. In addition to reading competence, we introduce into the analysis other relevant pre-university characteristics, such as socio-economic status and university admission grade. This will permit comparison of the effect of reading competence on students' academic performance during their first year (measured by the grades obtained in each subject) taking into account the mediating role of the admission grade. The study includes the effect of ESCS on both the admission grade and the reading competence of students.

Based on these considerations, the following study hypotheses are formulated:

H1: Reading competence affects the academic performance of first-year students.

H2: Reading competence affects the university admission grade of students.

We also study the possible effect of students' earlier academic performance (measured by their admission grade) and socioeconomic status (measured by the variables of parental education and occupations) in view of the influence of these aspects reported in the literature. The following hypotheses are also included:

H3: University admission grade influences the academic performance of first-year university students.

H4: Students' Economic Social and Cultural Status (ESCS) affects their reading competence.

H5: Students' ESCS influences their university admission grade.

Method

Participants

The study was carried out among first-year Business Administration and Management (BAM) Bachelor Degree students during the 2018/19 academic year at University of Las Palmas de Gran Canaria (ULPGC). From a total of 312 first-year students, 193 took part (103 men and 90 women), representing a response rate of 62%, with 4.36% as the maximum error for a confidence level of 95%.[1]

Measuring instruments

Reading comprehension test

To measure the reading comprehension proficiency of the first-year students, a test was prepared using some of the publicly available questions released by PISA, specifically the questions entitled 'Tall Buildings', 'Labour', 'The Motorcycle', 'Moreland' and 'Telecommuting' (OECD, 2009a, 2009b).

The questions for the test were chosen based on the need for similarity, in presentation and content, between typical assessment tools in first-year degree subjects and the PISA questions available (open access), as described in detail in the authors' study (González-Betancor et al., 2018).

The test was programmed using the Moodle Embedded Answers (Cloze) questions option for an estimated duration of 15 minutes, and conducted in one of the first-year subjects. Nevertheless, the average time to answer the test was 12 minutes.

Regarding participants recruiting, our study was carried out in September 2018 with the support of the lecturers of the first-year subjects of BAM Bachelor Degree. The lecturers

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[1] Complying with European regulations, the participants were informed by the professors of the subjects themselves that the questionnaire was part of an educational innovation project of the ULPGC. The format in which the data are processed and delivered includes encryption techniques that allow only aggregates and anonymous forms of statistical analysis.

provided part of their practical class time so that the students could fill in the test in their corresponding computer classroom. Lecturers explained to the students that participating in this test was voluntary and that it would not have any impact on their evaluation or grades. Thus, the presence of the lecturers in the classroom only guaranteed an important level of participation by the students and that they filled the test alone without any external help.

Administrative data

At the end of the academic year, in July 2019, the reading comprehension test records were linked to the sociodemographic administrative data on file for each student at the university, thus ensuring anonymity of the resulting database. The data were obtained from the admission form completed by students on enrolling and included information about their parents' education level and occupations (Table 1) and variables associated with their academic record before admission to the degree programme.

Table 1. Socioeconomic variables

	Father		Mother	
	N	%	N	%
Education level:				
Primary or less	38	16.7	22	11.4
Secondary	105	54.4	115	59.6
Higher	50	25.9	56	29.0
Occupation:				
Unemployed	25	12.9	47	24.3
Unskilled workers	69	35.8	87	45.1
Professionals and skilled workers	78	40.4	51	26.4
Managers	21	10.9	8	4.2

At the same time, students' grades on completing the 10 first-year subjects were linked to the resulting database, also including their admission grade (Table 2).

Table 2. Descriptive statistics of subject grades, reading comprehension test and admission grade

	N	Mean	Deviation	Min	Max
First-year BAM subjects					
500 – Fundamentals of Business Management	193	6.17	1.97	0	10
501 – Introduction to Accounting	157	3.15	2.61	0	10
502 – Principles of Microeconomics	193	3.16	2.74	0	8.6
503 – Business Mathematics	193	4.49	2.98	0	10
504 – Introduction to Law	157	4.94	2.26	0	10
505 – Business Design and Organisation	157	6.14	3.14	0	10
506 – Financial Accounting	193	3.43	3.27	0	10
507 – Principles of Macroeconomics	157	3.58	3.20	0	10
508 – Basic Statistics for Social Research	193	4.13	3.10	0	9.8
509 – History of Economics – Sociology	157	4.50	2.57	0	8.9
Reading comprehension test	193	15.42	1.86	8	18
Admission grade	193	7.41	1.18	5	10

Note 1: Students studying the Double Degree in BAM and Law do not study subjects 501, 504, 505, 507 and 509 in the first year, so the sample for these subjects is 157 students.

Note 2: Maximum achievable grade in each subject, reading comprehension test and admission grade is ten, eighteen, and ten, respectively.

Data analysis

To analyse the effect of reading competence on first-year BAM subject grades, as we suspect that a portion of this effect might be mediated through the admission grade, we estimate a Structural Equation Model (SEM). The advantage of this type of model is that it can be used for mediation analyses, allowing to fit a single model and estimate indirect and total effects, and even to use unobservable latent variables.

The analysis of the data was performed by confirmatory factor analysis (CFA) estimation to obtain an ESCS construct based on the education level and occupation of both parents using the maximum likelihood estimation method. This construct is included in the SEM, which attempts to explain which variables affect the grades obtained in first-year BAM studies, as shown in Figure 1. The model was estimated by maximum likelihood for each of the 10 first-year subjects through the SEM command in the STATA 15 software.

Figure 1. SEM Model
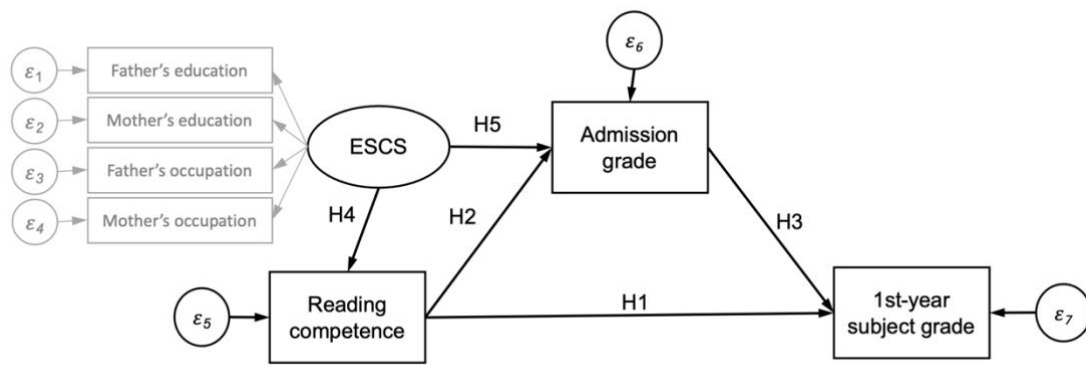
Note: Reading competence has a direct effect on first-year subject grades (H1) and an indirect effect through the admission grade (H2 and H3).

Results

ESCS construct

Table 3 shows that the variables used to estimate ESCS in both cases (with and without double degree students) are significant and present a Cronbach alpha value of more than 0.7. Individual reliability is acceptable, given that all the t-statistic values are significant, as the relationship between each item and its construct (ESCS) is statistically significant (Anderson & Gerbing, 1988). Together with the values higher than 0.7 for the composite reliability indicator (RI), this means that the construct is valid and reliable.

Table 3. CFA used to obtain ESCS

Causal relations		Estimators	t	p	Internal consistency
Sample with double degree students (N=193)					
Father's education	← ESCS	1			
Mother's education	← ESCS	1.05	7.22	0.000	$\alpha = 0.7182$
Father's occupation	← ESCS	0.98	6.06	0.000	FC = 0.7244
Mother's occupation	← ESCS	1.09	6.29	0.000	
Sample without double-degree students (N=157)					
Father's education	← ESCS	1			
Mother's education	← ESCS	0.96	6.40	0.000	$\alpha = 0.7182$
Father's occupation	← ESCS	0.89	5.31	0.000	FC = 0.7089
Mother's occupation	← ESCS	0.95	5.48	0.000	

Structural equations

Table 4 shows the estimation of the SEM model of Figure 1 for each first-year subject (Table 2). The goodness of fit measures are shown in the lower part of the table. The absolute fit measures start with the two chi square contrasts. The first of these compares the base model with the saturated model (chi2_bs), and the second compares the model of Figure 1 with the saturated model (chi2_ms). The result is identical for all subjects, indicating that the base model is rejected and the model of Figure 1 accepted. All the estimated models are therefore statistically significant. Nonetheless, because the result of these comparisons depends on the sample size, with the possibility of leading to acceptance of the models when working with small samples, it is advisable to analyse other measures. To this end, the root mean square error is shown by the Root Mean Square Error of Approximation (RMSEA), along with the probability associated with the statistic for the comparison of a value less than 0.05 (Browne & Cudeck, 1992), which is accepted in all the estimated models. Similarly, Table 4 shows the Standardised Root Mean Square Residual (SRMR), which has very low values in all the models, also indicating a good fit. The other incremental fit indices - Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) - exceed 0.95 in all the estimated models, indicating a good fit. Lastly, the coefficient of determination for each model is shown, exceeding 0.77 in all cases. It can therefore be concluded that the specified models correctly reproduce the covariance matrix observed.

With this goodness of fit, the models show the following results in relation to the hypotheses formulated:

- Reading competence in first-year BAM students affects the grade obtained in subjects during the first year, as well as the admission grade, with an almost identical effect in both cases (the estimated coefficient ranges from 0.19 to 0.27).

This evidence allows acceptance of Hypotheses H1 and H2.

- The admission grade affects the subject grade during the first year in all the estimated models. Therefore, H3 is also accepted (the estimated coefficients range from 0.78 for subject 500 to 1.23 for subject 507).

- It is also confirmed that ESCS affects reading competence, and therefore Hypothesis H4 is accepted, but ESCS has no direct effect on the admission grade, indicating that Hypothesis H5 cannot be accepted.

Because Hypotheses H1, H2 and H3 are accepted, the effect of reading competence on academic performance during the first year not only has a direct effect, but also has an indirect effect mediated through the admission grade. Therefore, the total effect of reading competence is higher than that observed directly. Table 5 shows the total effect on all first-year subjects and their breakdown. When the table is arranged by increasing order of the total effect, it is clear that subjects with a more theoretical content, such as Introduction to Law or Fundamentals of Business Management, are less affected by students' reading competence level than other subjects with a more numerical content, such as Financial Accounting, Business Mathematics and Basic Statistics for Social Research.

Table 4. Estimations of SEM models for first-year BAM subject grades

Variables	500	501	502	503	504	505	506	507	508	509
→ Admission grade										
H5: ESCS	0.14	-0.12	0.14	0.14	-0.12	-0.12	0.14	-0.12	0.14	-0.12
	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)	(0.21)
H2: Reading competence	0.22***	0.20***	0.22***	0.22***	0.20***	0.20***	0.22***	0.20***	0.22***	0.20***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Constant	4.05***	4.18***	4.05***	4.05***	4.18***	4.18***	4.05***	4.18***	4.05***	4.18***
	(0.71)	(0.72)	(0.71)	(0.71)	(0.72)	(0.72)	(0.71)	(0.72)	(0.71)	(0.72)
→ Reading competence										
H4: ESCS	1.28***	1.21***	1.28***	1.28***	1.21***	1.21***	1.28***	1.21***	1.28***	1.21***
	(0.34)	(0.37)	(0.34)	(0.34)	(0.37)	(0.37)	(0.34)	(0.37)	(0.34)	(0.37)
Constant	15.42***	15.26***	15.42***	15.42***	15.26***	15.26***	15.42***	15.26***	15.42***	15.26***
	(0.13)	(0.15)	(0.13)	(0.13)	(0.15)	(0.15)	(0.13)	(0.º5)	(0.13)	(0.15)
→ First-year subject grade										
H3: Admission grade	0.78***	1.10***	1.01***	1.13***	0.95***	1.00***	1.19***	1.23***	1.17***	0.89***
	(0.11)	(0.17)	(0.16)	(0.17)	(0.14)	(0.22)	(0.19)	(0.21)	(0.18)	(0.17)
H1: Reading competence	0.20***	0.19*	0.20**	0.23**	0.18**	0.21*	0.27**	0.20*	0.20*	0.23**
	(0.07)	(0.10)	(0.10)	(0.11)	(0.08)	(0.13)	(0.12)	(0.12)	(0.11)	(0.10)
Constant	-2.67**	-7.66***	-7.40***	-7.40***	-4.57***	-4.30**	-9.50***	-8.36***	-7.56***	1.21***
	(1.06)	(1.59)	(1.55)	(1.67)	(1.38)	(2.05)	(1.85)	(2.02)	(1.76)	(1.63)
Goodness of fit measures										
chi2_bs(21)	307.41	220.99	279.52	285.03	231.36	201.83	281.03	211.77	281.23	211.88
p > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
chi2_ms(12)	25.99	12.22	16.15	17.33	21.62	15.06	16.87	13.57	18.10	15.03
p > chi2	0.011	0.428	0.185	0.138	0.042	0.238	0.155	0.329	0.113	0.240
RMSEA	0.078	0.011	0.042	0.048	0.071	0.040	0.046	0.029	0.051	0.040
Pclose	0.121	0.734	0.549	0.478	0.209	0.553	0.505	0.649	0.434	0.555
SRMR	0.044	0.042	0.037	0.038	0.046	0.042	0.037	0.042	0.039	0.044
CFI	0.951	0.999	0.984	0.980	0.954	0.983	0.981	0.992	0.977	0.984
TLI	0.915	0.998	0.972	0.965	0.920	0.970	0.967	0.986	0.959	0.972
R^2	0.776	0.770	0.776	0.776	0.770	0.770	0.776	0.770	0.776	0.770
N	193	157	193	193	157	157	193	157	193	157

Note 1:Each column shows the result of the SEM model for each subject. The subject codes refer to: 500 – Fundamentals of Business Management; 501 – Introduction to Accounting; 502 – Principles of Microeconomics; 503 – Business Mathematics; 504 – Introduction to Law; 505 – Business Design and Organisation; 506 – Financial Accounting; 507 – Principles of Macroeconomics; 508 – Basic Statistics for Social Research; 509 – History of Economics and Sociology. Thus, the coefficients in column called 500, correspond to the values of the arrows in Figure 1 for the subject Fundamentals of Business Management. The coefficients in column called 509, correspond to the value of the arrows in Figure 1 for the subject History of Economics and Sociology.

Note 2:*** Significant at 1%; ** Significant at 5%

Note 3: chi2_bs (21): statistic for the baseline versus saturated test; chi2_ms(12): statistic for the model versus saturated test

Table 5. Total effect and breakdown of reading competence on grades in first-year BAM subjects, in increasing order.

First-year BAM subjects	Direct	Mediated by admission mark	Total
504 – Introduction to Law	0.18	0.19	0.36
500 – Fundamentals of Business Management	0.20	0.17	0.37
501 – Introduction to Accounting	0.19	0.22	0.41
505 – Business Design and Organisation	0.21	0.20	0.41
509 – History of Economics – Sociology	0.23	0.18	0.41
502 – Principles of Microeconomics	0.20	0.22	0.42
507 – Principles of Macroeconomics	0.20	0.24	0.45
508 – Basic Statistics for Social Research	0.20	0.25	0.45
503 – Business Mathematics	0.23	0.25	0.47
506 – Financial Accounting	0.27	0.26	0.53

Discussion

One of the challenges facing higher education institutions in the 21st century is to plan processes that will enable students to develop competences and maintain them after graduating. This challenge should be an education objective right when students enter university. Therefore, aiming to remedy the lack of studies on the influence of certain prior competences that may be influencing the academic performance of first-year university students, this study analyses a competence that has been systematically overlooked at this educational level, namely reading competence. While there are studies on competences focusing on educational levels up to university, there is still a lack of further research on competences at higher education level. Thus, our study contributes to filling this gap in the literature, for the specific case of first-year BAM students at ULPGC, estimating the direct influence of reading competence, but also that mediated through admission grades, always taking into account student's ESCS.

Firstly, the results demonstrate the direct correlation of reading competence on the academic performance of first-year university students. This result concurs with the findings of Nyarko et al. (2018) and Shahaeian et al. (2018) who demonstrated the

positive and direct relationships between reading competence and academic results at different levels of education. This finding in the first university semester as a transition between upper secondary school education and university provides information for a better understanding of first-year university students' results. Thus, first-year university studies should include instructional design and learning approaches, such as a reading lab (Douglas, 2019), aimed at improving reading comprehension, to enhance learning outcomes or even as prevention of the high attrition in the first year (Ding & Curtis, 2021; Manarin, 2019b). In Manarin's words (2019a, p. 14) "the goal has to be the development of competent, independent readers". Improving academic performance by developing reading literacy will therefore be a contributing element to reducing dropout or failure rates (Ding & Curtis, 2021; Naylor et al., 2018) and improving student's retention (Mills et al., 2009). Furthermore, since reading broadens knowledge and opportunities for participation in society, this habit should continue to be developed during university education (OECD, 2020). Therefore, from the first year of university, it should be included the reading of subject-specific academic texts, to ensure deep reading comprehension and the development of critical thinking (Cullinan, 2000; Manarin, 2019a) in order to prepare students as competent citizens of the 21st century (Alexander & The Disciplined Reading and Learning Research Laboratory, 2012).

Secondly, the study has confirmed the effect of reading comprehension also on the admission grades of university students, which primarily represents the academic achievement of upper secondary school education. By means of this admission grade, the reading competence has its indirect effect on the university academic performance. The literature confirms a strong relation between admission grade and subsequent academic performance (Byrne & Flood, 2008; Mills et al., 2009; Rodríguez et al., 2019b). But our research evidences that part of this relation is due to the reading competence.

Taking into account the direct and indirect effect, the results shown in Table 5 challenge us to analyse the significant differences between subject type, differentiating between more technical versus more theoretical subjects, according to Brown and Ryoo (2008) and Akbasli et al. (2016).

Thirdly, Bradley and Corwyn (2002) and van Bergen et al. (2017) reported that the occupation of an individual's parent had a direct influence on reading comprehension, and proposed to test their findings at later stages, in higher education. An important added value of the present study is the inclusion of student's ESCS in the analysis, as explanatory of both, reading comprehension and admission grade in the university context. Moreover, the influence of ESCS proves not to have a direct effect on admission grade, but its effect is mediated by reading literacy. Hence, policies aiming at compensating for inequalities in ESCS should improve reading literacy and, consequently, academic performance.

Lastly, the limitations of this study must be mentioned. The data provided by ULPGC are for the 2018/19 academic year, making it difficult to establish causal relations or generalise the findings. The reading comprehension test comprised items released by PISA and designed for secondary school students (aged 15-16), whereas the university students participating in the study were older. Because of this, we attempted to reduce the limitations by carefully selecting items with content that was as close as possible to the context of the BAM degree subjects.

Conclusion

We conclude summing up the main findings of our study:

- Reading literacy has a direct influence on grades in the first year of the BAM Bachelor Degree. The importance of this result lies in the fact that it indicates that the effect of

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reading literacy on educational performance is not only present at non-university levels, but that its influence extends at least to the first year of university.

- Reading literacy also has an indirect influence on the grades in the first year of the BAM Bachelor Degree, and this relationship is moderated by the admission grade. In other words, reading literacy has an effect on the admission grade which, in turn, influences the grades in the first-year subjects. We should highlight the importance of this result, since the appearance of this second (in this case, indirect) effect of reading literacy shows that at least part of the influence of the admission grade on first-year course grades stems from the level of development of this reading literacy skill among university students.

- Having included ESCS as a control variable in the SEM model, both for reading literacy and for the admission grade, and considering that this variable only influences reading literacy, we can conclude that knowing the students' level of reading literacy when entering university is important in order to improve their educational performance, especially for those who come from unfavourable socio-economic and cultural backgrounds. Therefore, it would be worthwhile for first-year university teaching staff to be aware of the results of this study in order to take them into account when organising their teaching, as well as to establish possible specific activities to compensate for them (such as case studies related to the contents of each subject that require direct work on this competence). This need for compensation, as mentioned above, is more necessary for students from lower socio-economic and cultural backgrounds.

As future work, we plan to test this result in other degrees in order to verify whether this reading literacy effect also appears in other fields of knowledge. This extension of the

study would allow us to contrast the results according to the type of subject in other degrees, to check whether the effect of this skill is greater in subjects with less memorised and more applied content, as is the case with BAM degree subjects. Furthermore, it would be interesting to know whether the influence of this competence on educational performance is maintained as students progress in their university studies, i.e. in courses higher the university entrance course.

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