



# Prediction of early dropout in higher education using the SCPQ

Emilio Jesús Lizarte Simón & José Gijón Puerta

To cite this article: Emilio Jesús Lizarte Simón & José Gijón Puerta (2022) Prediction of early dropout in higher education using the SCPQ, Cogent Psychology, 9:1, 2123588, DOI: [10.1080/23311908.2022.2123588](https://doi.org/10.1080/23311908.2022.2123588)

To link to this article: <https://doi.org/10.1080/23311908.2022.2123588>



© 2022 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.



Published online: 15 Sep 2022.



Submit your article to this journal [↗](#)



Article views: 159



View related articles [↗](#)



View Crossmark data [↗](#)



Received: 14 March 2022  
Accepted: 31 August 2022

\*Corresponding author: Emilio Jesús Lizarte Simón, University of Granada, Faculty of Educational Sciences, Department of Didactics and School Organization, University of Granada  
E-mail: [elizarte@ugr.es](mailto:elizarte@ugr.es)

Reviewing editor:  
Victoria Simms, University of Ulster,  
Ulster University, United Kingdom

Additional information is available at  
the end of the article

## EDUCATIONAL PSYCHOLOGY | RESEARCH ARTICLE

# Prediction of early dropout in higher education using the SCPQ

Emilio Jesús Lizarte Simón<sup>1\*</sup> and José Gijón Puerta<sup>1</sup>

**Abstract:** There is enormous concern at the international level vis-à-vis the retention of students in universities. Given that dropout rates and their social repercussions are causing great concern worldwide, researchers have been examining this issue to establish models to predict early dropout and to guide actions to support students who are at risk of dropping out. In this paper, we present a study we carried out at the University of Granada in which the risk of first-year students dropping out was analyzed by administering the College Persistence Questionnaire (CPQ v2) to 701 students who began their studies in the 2018/19 academic year. The data pertained to persisting at the institution one year later. The results indicated significant differences within the dimensions of academic and social integration, degree commitment, collegiate stress, academic advising and motivation, scholastic conscientiousness, institutional commitment, financial strain, and academic efficacy. These results align with a wide range of national and international studies.

**Subjects:** Educational Research; Education Studies; Higher Education

**Keywords:** higher education; student retention; student dropout

### 1. Introduction

There is substantial international concern around the retention of students in higher education institutions (Foster & Francis, 2019; Lastusaari et al., 2019), undoubtedly as a result of the social, familial, economic, and personal impacts that students experience when they abandon their pursuit of a university degree (Ahn & Davis, 2020; Bardach et al., 2020; Naylor & Mifsud, 2020).

Forming a precise, conceptual definition of “university dropout” is a complex task that goes beyond the theoretical field and is manifested in the policies, actions, and studies developed by universities and countries world over. The phenomenon is also difficult to measure because it requires not only knowing what we want to measure, but also having the appropriate and

### ABOUT THE AUTHORS

Emilio Jesús Lizarte Simón Assistant lecturer, Department of Didactics and School Organization, University of Granada. He has Degrees in Social Education and Pshycopedagogy; He has also DEA in Curriculum, Teachers and Educational Institutions; and PhD in Education. Research group collaborator Laboratory for Cognition, Health, Training and Interaction among Humans, Animals and Machines. His current research interest is focused in entrepreneurship education, VET, higher education, anxiety; depression; stress and teaching models based-on competencies. Deputy Editor of the international magazine *Journal for Educators, Teachers & Trainers JETT* (<http://jett.labosfor.com/index.php/jett/about/editorialTeam>).

José Gijón Puerta Assistant lecturer, Department of Didactics and School Organization, University of Granada. He has Degree in Science and DEA in Paleoanthropology: Human Evolution. Doctor of Pedagogy. Member of the Evolutive Biology Spanish Society (SESBE). Member of the Research Group Laboratory for Cognition, Health, Training and Interaction among Humans, Animals and Machines. SEJ-658 CHTI-HAM

necessary institutional data for a certain period of time. Thus, arriving at an exhaustive definition of “university dropout” is a complex process because of the multitude of variables that influence this decision; hence, universities introduce various curricula and institutional policies to reduce dropouts (Gairín et al., 2014). The international literature provides several conceptualizations of the university student dropout phenomenon that mention terms such as dropout, retention, and persistence (Bäulke et al., 2021). These terms are defined differently and used interchangeably on occasion. “Retention level” refers to the rate of permanence of students in a certain institution, whereas “persistence” refers to a certain student completing their education and earning their degree irrespective of the number of institutions they attend, that is, irrespective of whether they change universities or not (Fernández et al., 2014, p. 87).

According to Tinto (1975), dropout refers to an individual’s failure in relation to a certain capacity and commitment to the predetermined educational goals that were outlined at the time of enrollment. Among the commonly used definitions of dropout in the university context that Grau Valldosera (2020) reviewed, we highlight the following. First, according to Castles (2004), dropouts referred to students who had formally withdrawn from the course, had left without notifying the university, or did not complete a course during a semester. According to Dupin-Bryant (2004), it refers to students who did not complete a course during a semester. Pigliapoco and Bogliolo (2008) defined dropouts as students who did not re-enroll at the end of the first year (Grau Valldosera, 2020, p. 42). In the Spanish context, the National Center for Educational Statistics (Centro Nacional de Estadísticas Educativas) defined “‘retention’ as an institutional measure and ‘persistence’ as a student measure. In other words, institutions retain and students persist” (Hagedorn, 2006, p. 6). Another term that is commonly used with retention is “attrition,” which refers to “the diminution in the number of students resulting from lower student retention” (Hagedorn, 2006, p. 6). Drawing from the educational indicators for degrees earned compiled by the Ministry of Universities in the 2020 report titled *Data and Figures of the Spanish University System*, we treat the first-year dropout rate as the percentage of students in a cohort that are newly enrolled in undergraduate degree programs that do not re-enroll in the following two years. This is the use of “attrition” in our study, from Tinto’s Model, because we refer to *attrition* as dropping out in the first and second year of degree programmes.

Abarca and Sánchez (2005) indicated that as a function of time, dropouts can be partial, which refers to temporary leave from academic training, or total, which refers to a definitive departure from academic training. Dropout can be considered institutional when there is a continuous dropout associated with a certain university and systemic when the entire higher educational system is abandoned. Most studies have agreed that university dropouts occur mainly in the first year (Casanova et al., 2021; Wild & Schulze Heuling, 2020). The first few weeks of school are decisive because there is a greater risk of dropping out owing to the multitude of internal and external factors that intervene in the course of adaptation, which is accentuated more among students with lower degrees of self-perception and regulation in psychosocial and academic areas (Hilde et al., 2018; Wilson et al., 2019).

## 2. Causes of dropout

Díaz (2008, p. 70) organized student dropout analysis models by grouping them as follows: *Psychological models* (personality traits determine the decision to drop out or persist) such as the Reasoned Action Theory formulated by Fishbein and Ajzen (1975), the general model of academic choice formulated by Eccles et al. 1984, p. 29), which was analyzed in depth and expanded by Ethington (1990), and the model formulated by Bean and Eaton (2001), which focused on academic and social integration; *Sociological models*, among which the Undergraduate Dropout Process Model by Spady (1970) stands out (dropout is directly related to the non-integration of students in the new environment of higher education, with predictors like academic and social integration, socioeconomic status, gender, quality of the degree and average grades during the semester); *Economic models*, systematized by authors like A. F. Cabrera et al. (1992, 1993), Bernal et al. (2000), and St. John et al. (2000) based on the cost-benefit ratio (the

social and economic benefits of education are considered greater than those of alternative activities such as work) and the existence and organization of subsidies (scholarships and direct aid) that help students afford their university education; *Organizational models*, in which the qualities of the organization are those that fundamentally influence the dropout rates among new students (Berger, 2002; Berger & Milem, 2000; Kuh, 2002) and the social integration of students (related to the quality of teaching and the type of learning experiences that the student has) takes on special value (Braxton et al., 1997); and *Models based on interactions*, among which we highlight that of Tinto (1975), who explained persistence in university studies as a function of the adjustment between student and institution, which is achieved not only through academic but also social experiences (academic and social integration). As Tinto's (1987) evolved, both the previous experiences of the university and the characteristics of each individual, which are sensitive to the policies and practices of the institution in question, are considered influential in the decision to stay or leave and in reaching a more stable economic position (Tinto, 1989, 1993) by giving more weight to subsidies and the possibility of students bearing the costs.

Tinto's (1975, 1993) Institutional Departure Model, the most cited, used, and accepted one, which has been adapted to several specific contexts and is based on the initial idea that the social transition of first-year students is essential for their success because at that time, they must develop new relationships and integrate into a new community. The theoretical basis of our study is based on Tinto's model. Alongside models, there is an increasing number and variety of instruments that have been developed for the collection of personal, academic, family, and social data, and their repeated application has established their reliability and validity. However, the most commonly used questionnaire in recent years is the College Persistence Questionnaire (CPQv2), which we applied because of its wide use in previous studies at the international level (ex. Chew, 2019; Johnson, 2020; Lopez et al., n.d.; Reynolds & Cruise, 2020) and for its implementation in the Spanish context (García-Ros et al., 2019; Zamora et al., 2020). Based on the review of the questionnaire, we consider the CPQv2 questionnaire to be a suitable tool for our study, based on Tinto's theoretical model. The CPQ allows the staff of an institution to identify individual students who are more likely to drop out, in addition to providing a basis for analysis to design remedial programs (Lizarte, 2020). The analysis of the scores of the factors and individual elements often reveals the circumstances that caused the departure of a particular student (Davidson et al., 2009). From the perspective of instructors, "courses geared toward persistence and policymakers responsible for managing groups of students can use CPQ scores to determine the variables that best predict retention in their institutions" (Davidson et al., 2009, p. 387). The CPQ can help evaluate a remedial program by comparing instrument scores before, during, and after a program. This allows institutions to reformulate policies and programs designed to increase university persistence (Davidson et al., 2009). Thus, the CPQ "allows counselors, advisors, professors, and policymakers to move beyond a 'one size fits all' approach to attrition by individualizing retention efforts at the student and institution levels" (Davidson et al., 2009, p. 388). The CPQ v2 (Beck & Davidson, 2010; Davidson & Beck, 2018; Davidson et al., 2009) is a self-assessment instrument that evaluates the following 10 dimensions related to university dropout (See, Table 1):

We sought to determine the dimensions that have the greatest impact on the decision of students at the Faculty of Education Sciences at the University of Granada to abandon their studies. Based on the results derived using the CPQv2 instrument, we sought to specify the dropout profiles and make preventive and palliative proposals to address university dropouts in the first year.

### 3. Materials and method

#### 3.1. Context of study

In the Spanish context, where the study was carried out, a report by the BBVA Foundation in 2019 indicated that 21.7% of university students in Spain drop out in their first academic year. According to this report, Spain was one of the countries that did not adequately manage its investments in

higher education, as reflected in the high dropout rates. University dropouts in Spain cause the country annual losses of 974 million Euros (Fundación, 2019; Pérez & Aldás, 2019). The cost of each student who drops out is 5,120 Euro per year (Fundación, 2019). There are significant differences in the dropout rates based on the type of university. In the case of online universities, 62.1% of students drop out of undergraduate studies, while the rate is 26.5% in face-to-face universities. (Fundación, 2019; Ministry of Sciences, Innovation and Universities, 2019). These data are worrying if we look at the targets proposed by the European Council for 2020; Spain determined that its dropout rates should be close to 15% (Ministerio de Ciencia Innovación y Universidades, 2019). In this context, the University of Granada has proposed, within the framework of its Strategic Plan 2031 (UGR, 2022), to reduce the general dropout rate of the student body to at least below 20% compared to 27.7% as well as moving towards greater curricular flexibility in the design and modification of study plans. To this end, one of the innovative actions has been the creation of a Psycho-pedagogical Office, as a single space that includes all student support services: Information about personal, academic, or vocational issues raised by students; Referral of their demands to other services of the UGR or its environment when these cannot be satisfied by the cabinet as they are not within its competence; Personal, academic and vocational counseling; Training-workshops including habits and study techniques, strategies to improve the ability to speak in public, working as a team or preparing academic papers, among other activities.

### 3.2. Participants

The instrument was sent to the 894 students who began their university studies for the first time in the 2018/19 academic year in the Early Childhood, Primary, and Social Education and Pedagogy degree programs at the Faculty of Education, at the University of Granada. A total of 727 questionnaires were returned. Of these, 26 were excluded because they were incomplete. The response rate was 78%. The final sample comprised 701 students, of which 83.2% were women, and 16.8% were men (representative of the balance men/women in the Faculty of Education), aged between 17 and 51 years. The mean age was 20.6 years ( $SD = 3.8$ ). A total of 89.3% of the students who had enrolled continued their studies, whereas 10.7% dropped out. The study used random probability cluster sampling.

### 3.3. Measures

The College Persistence Questionnaire (CPQv2, Beck & Davidson, 2010; Davidson & Beck, 2018; Davidson et al., 2009) is a self-assessment instrument that integrates 54 items that evaluate 10 dimensions, namely (a) Academic integration (7 items); (b) Academic motivation (8 items); (c) Academic efficacy (5 items); (d) Financial strain (4 items); (e) Social integration (7 items); (f) Collegiate stress (4 items); (g) Academic advising (5 items); (h) Degree commitment (6 items); (i) Institutional commitment (4 items); and (j) Scholastic conscientiousness (4 items). Each participant had to make a choice between two extremes that ranged from “very satisfied” to “very dissatisfied” or “very” to “very little” (Davidson et al., 2009) However, owing to the characteristics of some of the questions in the instrument, the answers were not the same for all items: when students were asked about their level of satisfaction, an interval between “very satisfied” and “very dissatisfied” was used. When they were asked about how much they liked a particular aspect of their university life, the scale ranged from “a lot” to “very little.” The students’ responses were then transferred to a numerical scale (Zamora et al., 2020). Based on the question, the answers were transformed into favorability scores of 5 points based on whether the answer was related to something positive or negative about the student’s university experience ( $-2 =$  very unfavorable,  $-1 =$  somewhat unfavorable,  $0 =$  neutral,  $+1 =$  somewhat favorable, and  $+2 =$  very favorable; Davidson et al., 2009).

### 3.4. Procedure

The survey was conducted among first-year undergraduate students in the second semester of the 2018/19 academic year. Following the ethical standards of the University of Granada in terms of informing the students about the study, the application of the questionnaire, and the collection and confidential treatment of personal information, the survey was conducted during school hours

**Table 1. Dimensions of CPQv2 scale**

Dimension	Description	Sample
Academic integration (7 Items)	Refers to a student's potential to manage and rely on academic experiences, based on academic performance and intellectual development in the academic context (Clark et al., 2014; Pascarella & Terenzini, 1980, Pascarella & Terenzini, 1983).	In general, how satisfied you with the quality of instruction are you receive here?
Academic motivation (8 Items)	Is based on the student's interest and enjoyment while performing academic tasks. Studies like Robbins et al., 2004) and Clark et al. (2014) examined the academic motivations of students with potential academic performance and persistence concerns	In general, how enthusiastic you are about doing academic tasks?
Academic efficacy (5 Items)	Refers to a student's confidence in performing an academic task and obtaining good results (Bandura, 1997). However, "efficacy beliefs change over time within the same individual based on the perceived success or failure of the tasks performed" (DeWitz et al., 2009, p. 23).	How confident are you of getting the grades you want?
Financial strain (4 Items)	Focuses on students' concerns about financial difficulties that can influence their academic performance and decision to drop out. Students evaluate the costs and benefits linked to the studies in which they are enrolled, implying that their initial commitment to the institution will change over time (A. F. Cabrera et al., 1992; Donoso & Schiefelbein, 2007).	How difficult is it for you or your family to handle the costs of college?
Social integration (7 items)	Is based on the social involvement and engagement of a student with their peer group, in this case, with other university students (Clark et al., 2014; Pascarella & Terenzini, 1980, Pascarella & Terenzini, 1983).	How strong is your sense of connectedness with the faculty, students, and staff on this campus?
Collegiate stress (4 items)	Refers to the feelings of anguish and pressure that the student feels because of persistence in studying, for example, the stress generated by a student working a part-time job while studying and trying to obtain good grades.	Overall, how much stress do you experience while attending this institution?

(Continued)

**Table 1. (Continued)**

Dimension	Description	Sample
Academic advising (5 items)	Refers to the effective opinions derived from the academic advising and institutional communication processes. Academic intervention programs, such as academic advising and counseling, have a positive effect in the short term on the improvement of preuniversity academic deficiencies and the strengthening of remediation programs in institutions (Pascarella & Terenzini, 2005; Stewart et al., 2015).	How satisfied are you with the academic advice you receive here?
Degree commitment (6 items)	Refers to the level of personal importance that a student gives to obtaining a degree, in addition to the value that students and their support networks place on completing the degree (Davidson et al., 2009).	At this point in time, how strong would you say your commitment is to earn a college degree either here or elsewhere?
Institutional commitment (4 items)	Refers to the degree of trust and satisfaction with the selected university (Davidson et al., 2009). It predicts and estimates persistence in various retention models (Bean & Eaton, 2000; Nora et al., 2005, Roksa et al., 2020)	How much thought have you given to stopping your education here?
Scholastic conscientiousness (4 Items)	Refers to the timely performance of a student's academic responsibilities, that is, the execution and completion of academic obligations and work in a timely manner.	How often do you turn in assignments past the due date?

after participants signed an informed consent form, and with the support of teachers who were interested in the study and who agreed to give up some time during their classes for the survey to be completed. The survey took a maximum of 45 minutes to complete, and the average time taken was 35 minutes. The data pertaining to the persistence of the students at the institution a year later (academic year 2019/20) were obtained from the Administrative Services department at the University of Granada.

### 3.5. Data analysis

The qualitative variables are presented as absolute and relative frequencies. The quantitative variables are presented as the mean and standard deviation (SD). Groups were compared using the chi-squared test (qualitative variables) and student's t-test (quantitative variables) once the assumptions of normality (Kolmogorov-Smirnov test) and homogeneity of variance (Levene test) were verified. A logistic regression model was used to determine the ability of demographic variables and the CPQ scale to predict academic dropout. Differences with  $p < 0.05$  were considered statistically significant. The statistical analysis was performed using IBM® SPSS.

## 4. Results

Table 2 presents the descriptive and comparative demographic variables and the dimensions of the CPQ scale for both students who continued their studies and students who dropped out. The results showed that gender was not associated with dropping out. There was no statistically significant difference in terms of age between the those who continued their studies and those



**Table 2. Descriptive and comparative demographic variables and CPQ scale based on dropout**

	Dropout		Test	p-value	Effect size
	No (n = 626)	Yes (n = 75)			
<b>Gender, n (%)</b>			$\chi^2(1) = 0.20$	0.653	$V = 0.02$
Male	104 (16.6)	14 (18.7)			
Female	522 (83.4)	61 (81.3)			
<b>Age, mean (SD)</b>	20.63 (3.80)	20.49 (3.63)	$t(699) = 0.30$	0.766	$d = 0.04$
<b>Academic integration, mean (SD)</b>	0.75 (0.50)	-0.83 (0.46)	$t(699) = 26.07$	< 0.001	$d = 3.19$
<b>Academic motivation, mean (SD)</b>	-0.51 (0.50)	-0.47 (0.50)	$t(699) = -0.67$	0.506	$d = -0.08$
<b>Academic efficacy, mean (SD)</b>	0.78 (0.42)	-1.11 (0.46)	$t(699) = 36.44$	< 0.001	$d = 4.45$
<b>Degree commitment, mean (SD)</b>	1.21 (0.61)	0.15 (0.62)	$t(699) = 14.19$	< 0.001	$d = 1.73$
<b>Financial strain, mean (SD)</b>	-0.51 (0.69)	1.32 (0.68)	$t(699) = 21.74$	< 0.001	$d = 2.66$
<b>Social integration, mean (SD)</b>	-0.29 (0.47)	-0.27 (0.43)	$t(699) = -0.08$	0.935	$d = -0.01$
<b>Collegiate stress, mean (SD)</b>	-1.18 (0.61)	-1.17 (0.58)	$t(699) = -0.17$	0.866	$d = -0.02$
<b>Academic advising, mean (SD)</b>	-1.05 (0.62)	-1.59 (0.62)	$t(699) = 0.46$	0.649	$d = 0.06$
<b>Institutional commitment, mean (SD)</b>	1.52 (0.70)	0.34 (0.68)	$t(699) = 13.84$	< 0.001	$d = 1.69$
<b>Scholastic conscientiousness, mean (SD)</b>	0.72 (0.58)	-0.76 (0.57)	$t(699) = 0.55$	0.582	$d = 0.07$

V: Cramer's V; d: Cohen's d



**Table 3. Effect of demographic variables and the CPQ scale on dropout**

	<b>B (SE)</b>	<b>Wald</b>	<b>OR (95% CI)</b>	<b>p-value</b>
<b>Gender</b> ( <i>female vs. male</i> )	-0.09 (0.05)	3.152	0.92 (0.83–1.01)	0.076
<b>Age</b>	-0.02 (0.04)	0.223	0.98 (0.92–1.06)	0.637
<b>CPQ</b>				
Academic integration	-0.38 (0.16)	5.754	0.68 (0.50–0.93)	0.016
Social integration	-0.06 (0.04)	1.819	0.94 (0.87–1.03)	0.177
Degree commitment	-0.52 (0.15)	11.632	0.60 (0.44–0.80)	0.001
Collegiate stress	0.03 (0.02)	2.837	1.03 (0.99–1.07)	0.092
Academic advising	0.07 (0.05)	1.864	1.07 (0.97–1.19)	0.172
Academic motivation	-0.11 (0.07)	2.588	0.89 (0.78–1.02)	0.108
Scholastic conscientiousness	-0.10 (0.07)	2.294	0.90 (0.79–1.03)	0.130
Institutional commitment	-0.88 (0.19)	21.083	0.42 (0.29–0.60)	< 0.001
Financial strain	1.00 (0.23)	19.198	2.72 (1.74–4.25)	< 0.001
Academic efficacy	-0.73 (0.22)	10.792	0.48 (0.31–0.75)	0.001

B: regression coefficient; SE: standard error; OR: odds ratio; CI: confidence interval

who dropped out. The dimensions that showed significant differences on the CPQ scale were academic integration and efficacy, and degree and institutional commitment, for which the scores of students who continued were higher than those of students who dropped out. In contrast, in the financial strain dimension, the score for students who continued was lower than those of students who dropped out.

Table 3 presents the results of the multivariate logistic regression that was performed in order to determine the ability of the demographic variables and the CPQ scale to predict academic dropout. The variables that showed academic integration and efficacy, and degree and institutional commitment had indirect and statistically significant effects, revealing that high values in these dimensions decreased the probability of dropping out. In contrast, financial strain had a direct and significant effect. Therefore, the greater the financial strain, the greater the probability of dropping out. The logistic regression model was valid ( $\chi^2(12) = 36.31; p < 0.001$ ), with a coefficient of determination of 48% (Nagelkerke's  $R^2 = 0.48$ ). The Hosmer and Lemeshow tests confirmed the adequacy of the model ( $\chi^2(8) = 12.9; p = 0.115$ ). The classification table showed that the model correctly classified 92.0% of those who dropped out and 82.7% of those who persisted. Overall, the model correctly classified 91.0% of the students.

## 5. Discussion

Establishing early dropout profiles for university students was the general approach taken by studies that either examined the variables that influenced dropout or that influenced student retention at universities. The dimensions that seem to have the greatest impact on the probability of dropping out tended to be the same in most studies, regardless of the contexts in which they were applied or the instruments with which data were collected. One of the most commonly used instruments is the CPQ scale, which we also used in this study. In our case, *academic integration and efficacy*, *degree and institutional commitment*, and *financial strain* appear to be the dimensions of the CPQ scale with the greatest effect on the decision to leave or continue studies. Some of these dimensions were already referred to in the pioneering studies of Vincent Tinto (1975), which included the student's institutional commitment and learning skills among the most important

dimensions, which were later amended with the addition of aspects like economic situation (Tinto, 1987, 1987, 2017). Therefore, our findings coincide with those that were initially presented in this field. Our findings on the significance of certain dimensions of the CPQ broadly coincide with those described in many previous studies, in both Spain (García et al., 2019; Lizarte, 2020) and other geographical contexts (Davidson et al., 2015; Vautero et al. 2020; although it is true that international comparisons are important, the difference in contexts makes studies carried out in Spain necessary).

At the international level, we can first cite a recent biographical-narrative study carried out in the US by Zembrodt (2019). In this study, the commitment of the student at the beginning of the degree (which corresponds to *institutional* and *degree commitment* in our case) defined the level of dropout risk. Within these different levels of commitment, *financial strain* (which corresponds to low income in our case) moderated the likelihood of persistence. Schaeper (2020) conducted an extensive study with more than 10,000 students in the German context using various data collection instruments and by creating structural models. The results showed that academic integration was a key factor and played an important role in aspects pertaining to academic efficacy. In an international study that involved Portuguese and Spanish students, Martínez et al. (2019) not only established the importance of academic commitment in retention, but also suggested that it enhanced other important psychological resources that affect the decision to stay or leave.

In the Spanish context, among the most recent studies, Zamora et al. (2020) used the CPQ and other instruments to establish the probability of persistence among students at the University of Seville. They concluded that persistence is higher among students with a certain profile, that is, those who present high *academic integration* and *institutional commitment*, which were significant dimensions in our study as well. Ortiz Lozano and his collaborators studied approximately 1000 engineering students (Ortiz-Lozano et al., 2020) and found that academic efficacy appears to be a very important predictor of dropout.

## 6. Conclusions

The results of our study allow us to present the following conclusions for higher education institutions, especially in the Spanish context.

No significant result was found regarding gender as a predictor of dropout. We can assume that a more homogeneous group facilitates social and academic integration and can therefore decrease the tendency to dropout among those who identify with the group and increase the tendency to drop out among those who do not (see limitations below).

Student commitment (to both the institution and the degree) is a highly influential dimension in the decision to continue studies until completion (Castro, 2020; Del Valle & Cumsille, 2019). Although the factors associated with this dimension are diverse and may have been generated in the preuniversity stage, establishing a sense of belonging to the institution can be a positive action that helps maintain the level of commitment necessary for student retention.

Academic integration paves the way for the greater probability of retention. For this reason, systems for guiding and accompanying students throughout their studies should be strengthened. Recent experiences cited in the literature (Ortiz-Lozano et al., 2020; Rasco et al., 2020) have linked actions of academic integration with others of social interaction or support for the transition to a professional career (Hamilton et al., 2019).

Academic efficacy is an essential dimension of student retention and should therefore be considered a priority for any higher education institution (Atencia et al., 2020; Reyes & Meneses, 2019). Considering this, in most cases, students learn effective academic skills before they enter university. Universities can enhance or improve these skills by training the students in study techniques, improving their autonomy, providing collaborative work training, and developing metacognitive processes. While “zero courses” are

offered for first-year students in science programs (free courses before the commencement of official classes, which review the basic content of subjects in each degree), they can also be offered in social and legal science degrees and can be incorporated into training itineraries that are related to, among other things, study techniques. The Psych-pedagogical Office, as a service attached to the Vice-Rectorate for Students and Employability of the University of Granada, offers a workshop on study habits and techniques at the end of the first semester and beginning of the second for members of the university community. The development of such workshops can be complemented by providing zero courses. The workshop can be organized alongside the zero courses, during the second month of the first semester. This proposal can be coordinated by student delegations from each faculty and the vice-rector of students.

Finally, financial strain (resulting from the lack of the income necessary to be able to dedicate enough time to study and earn a degree) should be analyzed by higher education institutions. Although there are discrepancies in the efficacy of student scholarships, financial strain is a retention factor. Although scholarship and aid policies are highly developed in countries like Spain, which initially subsidizes 85% of the enrollment costs for all students attending public universities and waives the remaining 15% for a very high percentage of the student population, each institution of higher education must have specific resources to care for students who are at high risk of dropping out for economic reasons.

## 7. Limitations

Our study has a few limitations as we surveyed a non-probabilistic sample, which is not well-balanced sample between men and women, due to the large number of women studying in the Faculty of Education. It would be interesting to repeat this study in other contexts, such as in Social and Legal Sciences, Biomedical or Engineering degrees, with a more gender-balanced sample. Although most studies were conducted in the first year of university, we argue that it would be interesting to include second-year students to better analyze the evolution of variables that affect the dimensions associated with dropout. It would be interesting to replicate this study in other contexts, such as social and legal science degrees.

### Funding

Part of this research was supported by the Scholarship for the training of university teachers through the Doctoral Thesis - Análisis del abandono de los estudios en la Universidad de Granada. El caso de la Facultad de Ciencias de la Educación

### Author details

Emilio Jesús Lizarte Simón<sup>1</sup>

E-mail: [elizarte@ugr.es](mailto:elizarte@ugr.es)

ORCID ID: <http://orcid.org/0000-0002-9964-7271>

José Gijón Puerta<sup>1</sup>

<sup>1</sup> University of Granada Faculty of Educational Sciences.

Department of Didactics and School Organization,  
University of Granada, Granada, Spain.

### Disclosure statement

No potential conflict of interest was reported by the author(s).

### Data availability statement

The full dataset is not available for this study. Contact the first (EJL) or last author (JGP) for access to specific variables.

### Citation information

Cite this article as: Prediction of early dropout in higher education using the SCPQ, Emilio Jesús Lizarte Simón & José Gijón Puerta, *Cogent Psychology* (2022), 9: 2123588.

### References

Abarca, A., & Y Sánchez, M. A. (2005). La deserción estudiantil en la educación superior: El caso de la

Universidad de Costa Rica. *Actualidades*

*Investigativas en Educación*, 5, 1–22. <http://www.redalyc.org/articulo.oa?id=44759911>

Ahn, M. Y., & Davis, H. H. (2020). Students' sense of belonging and their socioeconomic status in higher education: A quantitative approach. *Teaching in Higher Education*, 1–14. <https://doi.org/10.1080/13562517.2020.1778664>

Atencia, D. J., Plaza, M. T., & Hernandez, H. E. (2020). Resiliencia, burnout y fracaso académico en estudiantes de Ingeniería. *Revista Espacios*, 41(11), 1–15.

Bandura, A. (1997). *Self efficacy: The exercise of control*. Freeman and Co.

Bardach, L., Lüftenegger, M., Oczlon, S., Spiel, C., & Schober, B. (2020). Context related problems and university students' dropout intentions—the buffering effect of personal best goals. *European Journal of Psychology of Education*, 35(1), 477–493. <https://doi.org/10.1007/s10212-019-00433-9>

Bäulke, L., Grunschel, C., & Dresel, M. (2021). Student dropout at university: A phase orientated view on quitting studies and changing majors. *European Journal of Psychology of Education*, 37, 853–876. <https://doi.org/10.1007/s10212-021-00557-x>

Bean, J. P., & Eaton, S. B. (2000). A psychological model of college student retention. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 48–61). Vanderbilt University Press.

Bean, J. P., & Eaton, S. (2001). The psychology underlying successful retention practices. *Journal of College Student Retention Research, Theory & Practice*, 3(1), 73–89. <https://doi.org/10.2190/6R55-4B30-28XG-L8U0>

- Beck, H. P., & Davidson, W. B. (2010). *The college persistence questionnaire: Esperanza university institutional commitment report fall 2009 freshman sample*. <https://www.beckdavidson.com/welcome/EsperanzaCreport2009.pdf>
- Berger, J. B. (2002). Understanding the organizational nature of student persistence: Empirically-based recommendations for practice. *Journal of College Student Retention: Re-search, Theory & Practice*, 3(1), 3–21. <https://doi.org/10.2190/3K6A-2REC-GJU5-8280>
- Berger, J., & Milem, J. (2000). Organizational behavior in higher education and student outcomes. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 15, pp. 269–338). Agathon.
- Bernal, E. M., Cabrera, A. F., & Terenzini, P. T. (2000). The Relationship between Race and Socioeconomic Status (SES): Implications for Institutional Research and Admissions Policies. AIR 2000 Annual Forum Paper. Annual Forum Paper.
- Braxton, J. M., Sullivan, A. S., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 12, pp. 107–164). Agathon.
- Cabrera, A. F., Nora, A., & Castaneda, M. B. (1992). The role of finances in the persistence process: A structural model. *Research in Higher Education*, 33(5), 571–593. <https://doi.org/10.1007/BF00973759>
- Cabrera, A., Nora, A., & Castañeda, M. (1993). College persistence: Structural equations modelling test of integrated model of student retention. *Journal of Higher Education*, 64(2), 123–320. <https://doi.org/10.2307/2960026>
- Casanova, J. R., Gomes, C. M. A., Bernardo, A. B., Núñez, J. C., & Almeida, L. S. (2021). Dimensionality and reliability of a screening instrument for students at risk of dropping out from higher education. *Studies in Educational Evaluation*, 68, 100957. <https://doi.org/10.1016/j.stueduc.2020.100957>
- Castles, J. (2004). Persistence and the Adult Learner. *Active Learning in Higher Education*, 5(2), 166–179. <https://doi.org/10.1177/1469787404043813>
- Castro, M. (2020). *Vínculo pedagógico y compromiso académico en la universidad: estudio de caso desde la perspectiva de los estudiantes*. Trabajo Final Maestría, Universidad Austral. <https://rii.austral.edu.ar/handle/123456789/825>
- Chew, Z. L. K. (2019). *Academic integration, social integration, and institution commitment among undergraduate students of a Private University in Kuala Lumpur (trabajo final grado)*. Tunku Abdul Rahman University College. Repositorio Institucional. <http://eprints.tarc.edu.my/id/eprint/13214>
- Clark, M. H., Middleton, S. C., Nguyen, D., & Zwick, L. K. (2014). Mediating relationships between academic motivation, academic integration and academic performance. *Learning and Individual Differences*, 33, 30–38. <https://doi.org/10.1016/j.lindif.2014.04.007>
- Davidson, W. B., & Beck, H. P. (2018, January 1). *The college persistence questionnaire: Angelo State University retention report global: Analysis of students enrolled in psychology courses in fall of 2007, 2009, 2013*. <https://hdl.handle.net/2346.1/36144>
- Davidson, W. B., Beck, H. P., & Grisaffe, D. (2015). Increasing the institutional commitment of college students: Enhanced measurement and test of a nomological model. *Journal of College Student Retention: Research Theory and Practice*, 17(2), 162–185. <https://doi.org/10.1177/1521025115578230>
- Davidson, W. B., Beck, H. P., & Milligan, M. (2009). The college persistence questionnaire: Development and validation of an instrument that predicts student attrition. *Journal of College Student Development*, 50(4), 373–390. <https://doi.org/10.1353/csd.0.0079>
- Del Valle, R., & Cumsille, B. (2019). Encuesta Nacional de Compromiso Estudiantil (ENCE) como aporte a la gestión institucional para la prevención del abandono y el rezago universitario. In N. Yahuar, L. Otálora, M. D. M. Pulido, H. Sierra, I. Flórez, J. Gómez, K. León, M. Novoa, J. Huérfano, & M. Vargas (Eds.), *Ixclabes2019* (Vol. 1, pp. 1321–1331). <https://revistas.utp.ac.pa/index.php/clabes/article/view/2780>
- DeWitz, S. J., Woolsey, M. L., & Walsh, W. B. (2009). College student retention: An exploration of the relationship between self-efficacy beliefs and purpose in life among college students. *Journal of College Student Development*, 50(1), 19–34. <https://doi.org/10.1353/csd.0.0049>
- Díaz, C. (2008). Modelo conceptual para la deserción estudiantil universitaria chilena. *Estudios pedagógicos (Valdivia)*, 34(2), 65–86. <https://dx.doi.org/10.4067/S0718-07052008000200004>
- Donoso, S., & Schiefelbein, E. (2007). Análisis de los modelos explicativos de retención de estudiantes en la Universidad: Una visión desde la desigualdad social. *Estudios Pedagógicos*, XXXIII(1), 7–27. <https://doi.org/10.4067/S0718-07052007000100001>
- Dupin-Bryant, P. A. (2004). Pre-entry variables related to retention in online distance education. *The American Journal of Distance Education*, 18(4), 199–206. [https://doi.org/10.1207/s15389286ajde1804\\_2](https://doi.org/10.1207/s15389286ajde1804_2)
- Eccles, J. S., Adler, T. F., & Meece, J. L. (1984). Sex differences in achievement: A test of alternate theories. *Journal of Personality and Social Psychology*, 46(1), 26–43. <https://doi.org/10.1037/0022-3514.46.1.26>
- Educaweb (20 de mayo de 2021). *Educación y Universidades recibirán más de 5 mil millones de euros de los fondos europeos de recuperación*. <https://www.educaweb.com/noticia/2021/05/20/educacion-universidades-recibiran-mas-5-mil-millones-euros-fondos-europeos-recuperacion-19557/>
- Ethington, C. (1990). A psychological model of student persistence. *Research in Higher Education*, 31(3), 279–293. <https://doi.org/10.1007/BF00992313>
- Europapress (22 de marzo de 2021). *El Gobierno utilizará 2.400 millones de fondos europeos para reducir el abandono escolar y desarrollar la digitalización*. <https://www.europapress.es/sociedad/educacion-00468/noticia-gobiernoutilizara-2400-millones-fondos-europeos-reducir-abandono-escolar-desarrollardigitalizacion-20210322182109.html>
- Fernández, M. R., Corengia, A., & Durand, J. (2014). Deserción y retención universitaria: Una discusión bibliográfica. *Pensando Psicología*, 10 (17), 85–96. doi <http://dx.doi.org/10.16925/pe.v10i17.787>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and Behavior*. Addison-Wesley.
- Foster, C., & Francis, P. (2019). A systematic review on the deployment and effectiveness of data analytics in higher education to improve student outcomes. *Assessment & Evaluation in Higher Education*, 22, 1–20. <https://doi.org/10.1080/02602938.2019.1696945>
- Fundación BBVA. (2019 April 25). Un 33% de los alumnos no finaliza el grado que inició y un 21% abandona sin terminar estudios universitarios. <https://www.fbbva.es/investigacion/>
- Gairín, J., Triadó, X. M., Feixas, M., Figuera, P., Aparicio, M., & Torrado, M. (2014). Student dropout rates in Catalan universities: Profile and motives for disengagement. *Quality in Higher Education*, 20(2), 165–182. <https://doi.org/10.1080/13538322.2014.925230>
- García, R., Pérez, F., Castillo, M., & Cavas, F. (2019). Predicting first-year college student retention:

- validation of the college persistence questionnaire in a Spanish sample. *Sustainability*, 11(16), 4425. <https://doi.org/10.3390/su11164425>
- García-Ros, R., Pérez-González, F., Fuentes, M. C., & Cavas-Martínez, F. (2019). Predicting first-year college student retention: Validation of the college persistence questionnaire in a Spanish sample. *Sustainability*, 11(16), 4425. <https://doi.org/10.3390/su11164425>
- Grau, J. (2020). A dropout definition for continuance intention and effective re-enrolment models in online distance learning. Tesis Doctoral, Universitat Oberta de Catalunya. <http://openaccess.uoc.edu/webapps/o2/handle/10609/112746>
- Hagedorn, L. S. (2006). *How to define retention: A new look at an old problem*. University of Southern California. <https://eric.ed.gov/?id=ED493674>
- Hamilton, L., Boman, J., Rubin, H., & Sahota, B. (2019). Examining the impact of a university mentorship program on student outcomes. *International Journal of Mentoring and Coaching in Education*, 8(1), 19–36. <https://doi.org/10.1108/IJMCE-02-2018-0013>
- Hilde, G., Bergvik, S., & Wynn, R. (2018). Long-term dropout from school and work and mental health in young adults in Norway: A qualitative interview-based study. *Cogent Psychology*, 5(1), 1–16. <https://doi.org/10.1080/23311908.2018.1455365>
- Johnson, L. J., Sr (2020). *A Correlational Analysis of Self-Perceived Transformational Leadership Styles of Seminarians and Their Persistence in Masters-Level Historically Black Theological Seminaries* (Doctoral Thesis, North Carolina Agricultural and Technical State University). <https://www.proquest.com/docview/2412281959?pq-origsite=gscholar&fromopenview=true>
- Kuh, G. D. (2002). Organizational culture and student persistence: Prospects and puzzles. *Journal of College Student Retention: Research, Theory & Practice*, 3(1), 23–39. <https://doi.org/10.2190/U1RN-C0UU-WXR-0E3M>
- Lastusaari, M., Laakkonen, E., & Murtonen, M. (2019). Persistence in studies in relation to learning approaches and first-year grades: A study of university chemistry students in Finland. *Chemistry Education Research and Practice*, 20(1), 452–467. <https://doi.org/10.1039/C8RP00244D>
- Lizarte, E. J. (2020). Early dropout in college students: The influence of social integration, academic effectiveness and financial stress. In E. F. J. H. Lucena, F. J. S. Ramos, J. A. L. Núñez, & Y. J. M. R. Rodríguez (Eds.), *En Experiencias e Investigaciones en Contextos Educativos* (pp. 519–531). Dykinson.
- Lopez, A., Gonzalez, I., Piña-Watson, B., & Kim, S. Y. (n.d.). Family influence as it relates to college persistence of latinx college students: An examination of major satisfaction as a mediator. [https://webcache.googleusercontent.com/search?q=cache:dxUXJnz6Hl8J:https://www.depts.ttu.edu/psy/media/posters/ILIANA\\_NLPA\\_2019\\_Poster.pdf&cd=1&hl=es&ct=clnk&gl=es&client=firefox-b-d](https://webcache.googleusercontent.com/search?q=cache:dxUXJnz6Hl8J:https://www.depts.ttu.edu/psy/media/posters/ILIANA_NLPA_2019_Poster.pdf&cd=1&hl=es&ct=clnk&gl=es&client=firefox-b-d)
- Martínez, I. M., Youssef-Morgan, C. M., Chambel, M. J., & Marques-Pinto, A. (2019). Antecedents of academic performance of university students: Academic engagement and psychological capital resources. *Educational Psychology*, 39(8), 1047–1067. <https://doi.org/10.1080/01443410.2019.1623382>
- Ministerio de Ciencia Innovación y Universidades. (2019). *Indicadores de rendimiento académico 2017-2018*. <http://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas/universitaria/estadisticas/rendimiento-academico.html>
- Naylor, R., & Mifsud, N. (2020). Towards a structural inequality framework for student retention and success. *Higher Education Research & Development*, 39(2), 259–272. 360.2019.16701 43 <https://doi.org/10.1080/07294>
- Nora, A., Barlow, E., & Crisp, G. (2005). Student persistence and degree attainment beyond the first year in college. In A. Seidman (Ed.), *College student retention: Formula for success* (pp. 129–154). American Council on Education and Praeger Publishers.
- Ortiz-Lozano, J. M., Rua-Vieites, A., Bilbao-Calabuig, P., & Casadesús-Fa, M. (2020). University student retention: Best time and data to identify undergraduate students at risk of dropout. *Innovations in Education and Teaching International*, 57(1), 74–85. <https://doi.org/10.1080/14703297.2018.1502090>
- Pascarella, E. T., & Terenzini, P. T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, 51(1), 60–75. <https://doi.org/10.2307/1981125>
- Pascarella, E. T., & Terenzini, P. T. (1983). Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: A path analytic validation of Tinto's model. *Journal of Educational Psychology*, 75(2), 215–226. <https://doi.org/10.1037/0022-0663.75.2.215>
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research* (Vol. 2). Jossey-Bass.
- Pérez, F., & Aldás, J. (2019). *Indicadores Sintéticos de las Universidades Españolas*. Fundación BBVA e Ivie.
- Pigliapoco, E., & Bogliolo, A. (2008). The effects of psychological sense of community in online and faceto-face academic courses. *International Journal of Emerging Technologies in Learning*, 3(4), 60–69. <https://doi.org/10.3991/ijet.v3i4.201>
- Rasco, D., Day, S. L., & Denton, K. J. (2020). Student retention: Fostering peer relationships through a brief experimental intervention. *Journal of College Student Retention: Research, Theory & Practice*, 1521025120972962. <https://doi.org/10.1177/1521025120972962>
- Reyes, N., & Meneses, A. L. (2019). *Una revisión crítica de los factores psicosociales asociados al abandono universitario en primer año*. Claves. <https://revistas.utp.ac.pa/index.php/claves/issue/view/122>
- Reynolds, J., & Cruise, S. (2020). Factors that influence persistence among undergraduate students: An analysis of the impact of socioeconomic status and first generation students. *Interchange: A Quarterly Review of Education*, 51(2), 199–206. <https://doi.org/10.1007/s10780-020-09408-y>
- Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstron, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, 130(2), 261–288. <https://doi.org/10.1037/0033-2909.130.2.261>
- Roksa, J., Deutschlander, D., & Whitley, S. E. (2020). Parental validation, college experiences, and institutional commitment of first-generation and low income students. *Journal of Student Affairs Research and Practice* 581, 1–15. <https://doi.org/10.1080/19496591.2019.1699105>
- Schaeper, H. (2020). The first year in higher education: The role of individual factors and the learning environment for academic integration. *Higher Education*, 79(1), 95–110. <https://doi.org/10.1007/s10734-019-00398-0>
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 19(1), 109–121. <https://doi.org/10.1007/BF02214313>
- Stewart, S., Lim, D. H., & Kim, J. (2015). Factors influencing college persistence for first time students. *Journal of*



- Developmental Education*, 38(3), 12–20. <https://files.eric.ed.gov/fulltext/EJ1092649.pdf>
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89–125. <https://doi.org/10.3102/00346543045001089>
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. University of Chicago Press.
- Tinto, V. (1989). *Una reconsideración de las teorías de la deserción estudiantil. En trayectoria escolar en la educación superior*. ANUIES-SEP.
- Tinto, V. (1993). *Leaving college: rethinking the causes and cures of student attrition* (2nd ed.). University of Chicago Press.
- Tinto, V. (2017). Through the eyes of students. *Journal of College Student Retention: Research, Theory and Practice*, 19(3), 254–269. <https://doi.org/10.1177/1521025115621917>
- Vautero, J., Pozobon, L., & Silva, A. D. (2020). Cuestionario de permanencia académica: Adaptación cultural y evidencias de validez. *Avaliação Psicológica*, 19(4), 390–399. <https://doi.org/10.15689/ap.2020.1904.17873.05>
- Wild, S., & Schulze Heuling, L. (2020). Student dropout and retention: An event history analysis among students in cooperative higher education. *International Journal of Educational Research*, 104, 101687. <https://doi.org/10.1016/j.ijer.2020.101687>
- Wilson, C. A., Babcock, S. E., & Saklofske, D. H. (2019). Sinking or swimming in an academic pool: A study of resiliency and student success in first-year undergraduates. *Canadian Journal of Higher Education*, 49(1), 60–84. <https://doi.org/10.7202/1060824ar>
- Zamora, Á., Gil, J., & De Besa, M. R. (2020). Learning approaches, time perspective and persistence in university students. *Educacion XX1*, 23(2), 17–39. <https://doi.org/10.5944/educxx1.25552>
- Zembrodt, I. (2019). Commitment: Predicting persistence for low-SES students. *Journal of College Student Retention: Research, Theory & Practice*, 23(3), 152102511985834. <https://doi.org/10.1177/1521025119858340>



© 2022 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



**Cogent Psychology (ISSN: 2331-1908) is published by Cogent OA, part of Taylor & Francis Group.**

**Publishing with Cogent OA ensures:**

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

**Submit your manuscript to a Cogent OA journal at [www.CogentOA.com](http://www.CogentOA.com)**

