FACULTAD DE CIENCIAS ECONÓMICAS Y DE ADMINISTRACIÓN

IECON INSTITUTO DE ECONOMÍA

UNIVERSIDAD DE LA REPÚBLICA URUGUAY

Psychological and cognitive factors associated with university dropout: A Comparative Study of Economics and Psychology Students in Uruguay

Alina Machado, Fedora Carbajal, Lucía Alvarez-Nuñez, Cecilia Rodriguez, Alejandro Maiche y Alejandro Vásquez-Echeverría

INSTITUTO DE ECONOMÍA
Serie Documentos de Trabajo

Abril, 2025
DT 12/2025

ISSN: 1510-9305 (en papel)
ISSN: 1688-5090 (en línea)

Agradecemos el apoyo de la Comisión Sectorial de Enseñanza a través del llamado a proyectos de investigación para la mejora de la calidad de la enseñanza (PIMCEU).

Forma de citación sugerida para este documento: Machado, A.; Carbajal, F.; Alvarez-Nuñez, L.; Rodriguez, C; Maiche, A.; Vásquez-Echeverría, A. (2025) “Psychological and cognitive factors associated with university dropout: A Comparative Study of Economics and Psychology Students in Uruguay”. Serie Documentos de Trabajo, DT 12/2025. Instituto de Economía, Facultad de Ciencias Económicas y Administración, Universidad de la República, Uruguay.

Psychological and cognitive factors associated with university dropout: A Comparative Study of Economics and Psychology Students in Uruguay

Alina Machado[i], Fedora Carbajal[ii], Lucía Álvarez[iii], Cecilia Rodríguez[iv], Alejandro Maiche[v], Alejandro Vásquez[vi]

Resumen

Las características de la personalidad, otros rasgos psicológicos y las habilidades cognitivas, se han relacionado consistentemente con el desempeño académico. Sin embargo, existe evidencia empírica limitada sobre cómo estos factores influyen conjuntamente en las decisiones de abandono escolar. Este trabajo examina la relación entre los rasgos de la personalidad en el modelo de los cinco grandes (big five en inglés), la consideración de las consecuencias futuras y la inteligencia fluida, en las decisiones de abandono escolar entre estudiantes de segundo año de las facultades de Ciencias Económicas y de Administración y Psicología de la Universidad de la República. Utilizamos información de una muestra de la cohorte 2018 para analizar los patrones de abandono a través de modelos de variable dependiente cualitativa. Nuestros hallazgos revelan que los rasgos de personalidad y la inteligencia fluida están significativamente asociados con las decisiones de abandono escolar, aunque sus efectos varían según la disciplina académica. Además, identificamos patrones distintos de influencia de los rasgos de personalidad y las habilidades cognitivas en las tipologías de abandono instruccional y sistémico. Estos hallazgos contribuyen a la creciente literatura sobre los determinantes psicológicos de los resultados educativos y ofrecen perspectivas para las políticas de educación superior dirigidas a mejorar la retención estudiantil.

Palabras clave: educación universitaria, abandono instruccional, abandono sistémico, personalidad, inteligencia fluida, trayectorias académicas

Código JEL: I20, I21, I23

[i] Iecon - FCEA - Udelar; alina.machado@fcea.edu.uy
[ii] Iecon - FCEA - Udelar; fedora.carbajal@fcea.edu.uy
[iii] IFFMM - Fac. Psicología - Udelar; lucia.alvarez@psico.edu.uy
[iv] PPD - University of North Carolina at Chapel Hill; c.rodriguez@unc.edu
[v] CICEA - Fac. Psicología - Udelar; amaiche@psico.edu.uy
[vi] CICEA - Fac. Psicología – Udelar; avasquez@psico.edu.uy

Abstract

Personality traits, other psychological factors, and cognitive abilities have consistently been related to academic performance. However, there is limited empirical evidence on how these factors jointly influence dropout decisions. This study examines the relationship between big-five personality traits, consideration of future consequences, and fluid intelligence on dropout decisions among second-year students in the Economics and Psychology colleges at Uruguay's largest university. Using data from the 2018 student cohort and controlling for a range of sociodemographic and economic variables, we employed Probit and Multinomial Models to analyze dropout patterns. Our findings reveal that personality traits and fluid intelligence are significantly associated with dropout decisions, though their effects vary across different academic disciplines. Moreover, we identify distinct patterns in the influence of personality traits and cognitive abilities on instructional versus systemic dropout. These findings contribute to the growing literature on psychological determinants of educational outcomes and offer insights for higher education policy aimed at improving student retention.

Keywords: higher education, instructional and systemic dropout, personality, fluid intelligence, academic trajectories.

JEL Code: I20, I21, I23

1. Introduction

University dropout represents a significant challenge, imposing substantial costs on educational systems and individuals (OECD, 2022). This issue is particularly pressing in Latin America and especially in Uruguay, where nearly half of university students fail to complete their degrees due to ongoing enrollment or premature withdrawal (UNESCO, 2021). Understanding dropout patterns requires examining the interplay of three key dimensions: origin, personality, and socialization. *Origin* refers to students' social and family background, including cognitive abilities that shape their early educational opportunities. *Personality*, particularly the Big Five traits and Consideration of Future Consequences, plays a crucial role in academic persistence and decision-making. *Socialization* captures how educational choices and qualifications within specific study programs influence student trajectories. Together, these dimensions shape students' decisions to pursue higher education, influence their expectations, and impact their likelihood of persisting, underscoring the complex nature of university dropout across diverse institutional contexts.[1]

University dropout takes different forms depending on the stage and circumstances of a student's departure (Ulriksen et al., 2010; Hovdhaugen, 2009; Tinto, 1993; Tinto, 1987). While it is often defined as a student leaving their institution before completing the first year of study, Tinto (1993) provides a more nuanced framework distinguishing between two types of departure: *institutional departure*, where students transfer to other programs or institutions, and *system departure*, where students exit higher education entirely. Following this conceptual distinction, we refer to institutional departure as *instructional dropout* and system departure as *systemic dropout* throughout this study.

The factors driving instructional dropout may differ substantially from those leading to systemic dropout, making it essential to distinguish between these pathways when analyzing student departure. Understanding these distinct mechanisms is crucial for developing targeted interventions that effectively address specific needs and challenges of each group. By examining these differences through the lens of origin, personality, and socialization, we can gain a more comprehensive understanding of dropout patterns and design more effective strategies to promote student retention and academic success.

We aim to contribute to the current literature in four significant ways. First, we examine simultaneously how cognitive abilities (measured by Raven's test) and personality traits (the Big Five traits and Consideration of Future Consequences) are associated with dropout among second-year university students, including both active students and those who recently became inactive. Second, we conduct a comparative analysis of these associations across two distinct academic programs at Universidad de la República (Udelar) in Uruguay: Psychology and Economics and Administration. Although both are among Udelar's most populated programs and share a four-year professional training structure, previous research suggests that students' personalities differ significantly across majors and may predict different academic performance (Vedel et al., 2015). Third, we investigate the specific

[1] Isleib et al. (2019); Kehm et al. (2019) and Neugebauer et al. (2019) give a detailed overview with current empirical results of predictors in this phase.

conditions under which individual differences are associated with different types of dropout (systemic or instructional) - an area where research on cognitive and psychological predictors remains limited. Moreover, comparing majors allows us to examine whether predictors of instructional and systemic dropout vary significantly between institutions. Fourth, we expand the contexts in which these phenomena are studied. While most research on university dropout has focused on higher education systems in developed countries, particularly in Europe and North America, we analyze university dropout in a Global South context. The case of Udelar in Uruguay provides a particularly relevant case for studying dropout in Latin America, as it is the country's largest university, serving more than 140,000 students nationwide and accounting for 86% of total university enrollment.

To address these research aims, we combine administrative data with student surveys and a set of instruments administered to samples from both programs to answer three key research questions:

RQ1: To what extent is dropout associated with cognitive abilities and personality traits?

RQ2: Do these factors relate differently to dropout decisions in Economics and Psychology majors?

RQ3: Do cognitive abilities and personality traits play distinct roles in systemic versus instructional dropout?

2. Literature review

In higher education, dropout occurs predominantly during the early years of study and is particularly common in programs leading to professional careers, which tend to have higher enrollment rates (Ortiz & Dehon, 2013; Stinebrickner & Stinebrickner, 2012; Arcidiacono et al., 2010). Key sociodemographic and economic factors that are associated with the likelihood of dropout include age, gender, student employment status, family net income, access to scholarships, and parental education level (Chiarino et al., 2024; Helland & Strømme, 2024; Herbaut, 2021; Munizaga et al., 2018).

Several studies have examined students' expectations when attending university (Lobo et al., 2013; Baloo et al., 2017), while others have focused on behavioral intentions, such as the intention to drop out (Galve-Gonzalez et al., 2024; Molnár & Kocsis, 2023; Nemtcan et al., 2020). Much of the existing research has explored the relationship between personality traits and academic performance, often measured by GPA. However, studies specifically addressing the role of personality traits and cognitive abilities in students' decisions to drop out of higher education remain limited. In the context of Latin American higher education, little is known about how individual differences—such as personality traits, motivation, and ability—contribute to dropout decisions. Moreover, it remains unclear whether these relationships vary by academic major or whether they can reliably predict dropout across diverse fields of study and educational contexts.

This study contributes to the literature on dropout predictors by incorporating cognitive abilities, measured through the Raven test, as a key control variable. Previous research has demonstrated a moderate to strong association between cognitive abilities (e.g., intelligence)

and academic performance (Kaufman & Lichtenberger, 2005). Additionally, Big Five personality traits have been linked to both self-reported and directly assessed fluid intelligence (Chamorro-Premuzic et al., 2005) and have been shown to predict academic achievement beyond the effects of intelligence alone (Lechner et al., 2017). Therefore, to understand the role of personality traits and future orientation in dropout behavior, it is relevant to account for the influence of intelligence.

Individual differences are widely recognized as key predictors of academic outcomes, with personality traits assessed through the Big Five taxonomy consistently linked to academic achievement. A seminal meta-analysis (O'Connor & Paunonen, 2007) identified conscientiousness as the personality trait most strongly associated with post-secondary educational success, typically measured by grades or classroom performance, with a meta-analytic effect size of r = .24. Other traits, such as openness, showed a weaker positive association, while extraversion was negatively related to academic achievement, though these findings varied across studies. More recently, Mammadov (2022) demonstrated that personality traits, particularly conscientiousness, provide incremental validity beyond cognitive performance, even within post-secondary education, further underscoring the relevance of non-cognitive factors for academic success.

As this study focuses specifically on dropout decisions, it is relevant to consider that the relationship between personality traits and academic achievement may vary depending on the outcome assessed. Trapmann et al. (2007) found that (a) conscientiousness is positively associated with GPA, with a meta-analytic effect size of r = .27; (b) neuroticism is negatively associated with academic satisfaction and; (c) openness, extraversion, and agreeableness show no significant association with academic success (whether measured by grades, dropout, or academic satisfaction). Notably, only a few studies have examined retention or dropout as outcome variables, and these do not simultaneously measure the Big Five personality traits alongside the cognitive abilities scores.

Beyond the factors outlined in the Big-five model, future orientation is an individual difference linked to academic performance. Academic pursuits often involve a temporal dilemma between immediate gratification and long-term rewards. For instance, students must choose between dedicating their weekends to studying for an exam scheduled months ahead (a present action tied to a future benefit) or socializing with friends (an activity that provides immediate enjoyment but may compromise future academic performance). Consideration of future consequences (CFC) is a construct that assesses the extent to which individuals take immediate versus distant outcomes into account when making decisions (Strathman et al., 1994). Previous studies have found that CFC positively correlates with GPA, test scores, and course completion (Acuff et al., 2017; Joireman, 1999; Peters et al., 2005). A meta-analysis by Andre et al. (2018) reported a small to moderate association between future orientation and educational outcomes. Additionally, research has shown that CFC is associated with academic commitment and performance (Acuff et al, 2017; Loose & Vásquez-Echeverría, 2023). Therefore, we expect students with higher CFC to be less likely to drop out compared to students with a more present-oriented perspective.

Drawing on the extant literature, we anticipate several key associations between psychological constructs and student dropout. Specifically, we expect dropout to be

negatively associated with cognitive abilities, conscientiousness, and consideration of future consequences (CFC-F), as these factors are theorized to enhance academic persistence by fostering goal-directed behavior, social integration, and long-term planning. Conversely, we posit positive associations between dropout and openness, neuroticism, extraversion, and consideration of immediate consequences (CFC-I). While openness is often associated with creativity and exploration, it may also lead to divergent interests that detract from academic focus. Similarly, neuroticism and a heightened focus on immediate consequences may exacerbate stress and impulsive decision-making, thereby increasing dropout risk. Furthermore, we expect these associations to vary in magnitude depending on the type of dropout. Specifically, the effects are anticipated to be weaker among students experiencing instructional dropout (e.g., those leaving to other tertiary education programs) compared to those experiencing systemic dropout (e.g., those leaving due to structural barriers preventing continuation in higher education). Finally, we anticipate that the predictive models will differ across academic disciplines, with distinct patterns of associations emerging among Economics and Psychology students. This disciplinary variation is likely attributable to differences in curricular demands, career trajectories, course-related factors, and the psychological profiles of students self-selecting into these fields. By examining these relationships, this study aims to provide a more nuanced understanding of the psychological and contextual factors underlying student attrition.

3. Empirical strategy

3.1 Institutional background and data

The educational system in Uruguay consists of four levels: Preschool (ages 3-6), Primary (ages 6-12), Secondary (ages 12-18), and Tertiary (ages 18+). Public education is universally accessible and free of charge at all levels, from preschool through university. While the Administración Nacional de Educación Pública (ANEP) oversees public education at the pre-tertiary levels, tertiary education is by the Udelar. Udelar held a monopoly on higher education until the 1980s, and despite the subsequent emergence of private universities and the establishment of a new public university in 2012, it remains the dominant institution in tertiary education. Currently, Udelar accounts for over 86% of total tertiary enrollment and offers the country's most comprehensive range of academic disciplines (Udelar, 2023).

Within Udelar, two of the largest academic units are the Facultad de Ciencias Económicas y de Administración (FCEA) and the Facultad de Psicología (FP). FCEA offers degrees in accountancy, administration, economics, and statistics, while FP provides professional training in psychology. Both colleges offer four-year programs and are among the most populous at Udelar, collectively accounting for 24% of the university's total enrollment (Udelar, 2022). Despite these similarities in program duration and enrollment size, the student populations in these colleges exhibit distinct demographic and academic profiles.

This study focuses on the 2018 student cohort at both colleges, comprising 2,613 students enrolled in FCEA and 2,231 in FP. Administrative records were used to collect data on each student's date and place of birth, gender, and secondary school. From the total number of new students in each college, a representative sample was drawn (n = 797 in FCEA and n = 809 in FP). Data collection was conducted in two phases, with students contacted via email, cell phone calls, and WhatsApp Messenger.

The first phase, conducted from April to June 2019, consisted of a short telephone questionnaire assessing students' enrollment status at FCEA and FP. Response rates were notably high, with 738 FCEA students (93%) and 580 FP students (72%) participating. Students who reported no longer being enrolled completed an additional questionnaire exploring their reasons for non-persistence and current educational status, allowing for differentiation between instructional and systemic dropout. This initial assessment revealed that 237 students (32%) in the FCEA sample and 303 students (52%) in the FP sample had dropped out. Among these, 161 FCEA students (68%) and 135 FP students (45%) were classified as instructional dropouts, meaning they had enrolled in another university program or tertiary institution.

The second phase focused on assessing personality traits and cognitive characteristics through detailed questionnaires. Participation rates in this phase were 43% (314 students) for FCEA and 65% (379 students) for FP, relative to first-phase participants. To incentivize participation, students who completed the survey were entered into a raffle for shopping vouchers at a local shopping center. The study protocol was approved by the FP ethics committee.

3.2 Dropout information and instruments

Dropout information. Dropout status was assessed by asking: “Are you currently enrolled in an academic program?” Participants who responded "no" were asked to specify their reasons for leaving their studies. To further refine our understanding, a follow-up question determined whether they were enrolled in another degree program. This distinction allowed for the classification of dropouts into two categories: instructional dropout (students no longer enrolled in FCEA or FP but continuing their studies in another program) and systemic dropout (students no longer pursuing their university studies). In this paper, dropout was operationalized as a binary variable, assigning a value of 1 to students who dropped out and 0 otherwise. Additionally, a categorical variable was created to differentiate among no dropout (the student did not drop out), instructional dropout (leaving the specific FCEA or FP program but continuing in another university program), and systemic dropout (total abandonment of higher education). This classification allows for a more nuanced analysis of dropout patterns.

Sociodemographic and economic questionnaire. Sociodemographic and economic data were collected through a standardized instrument administered alongside a university-wide questionnaire. This instrument gathered information on students' sex, employment status, place of residence, and scholarship status.

Consideration of Future Consequences Scale (CFC) - Adapted to Education. The CFC scale assesses how individuals, when making decisions, consider and are influenced by both immediate and distant outcomes of their behaviors (Strathman et al., 1994). We used the 14-item version, with responses on a 7-point Likert scale (1 = not at all characteristic of me; 7 = very characteristic of me) (Joireman et al., 2012). This scale includes two subscales: Consideration of Future Consequences (CFC-F) and Consideration of Immediate Consequences (CFC-I). The version used in this study was adapted to the academic context based on the general Spanish version of the CFC scale (Vásquez-Echeverría et al., 2018). Domain-specific adaptations of the CFC scale have demonstrated very good-to-excellent psychometric properties in both Spanish (Álvarez-Nuñez & Vásquez-Echeverría, 2023; Alvarez-Nuñez et al., 2023) and English (Murphy et al., 2020). A sample item from the CFC-

F subscale is: "I think it is more important to pursue educational behaviors that have important long-term consequences than those that have less significant immediate educational outcomes." A sample item from the CFC-I subscale is: “I act only to meet my immediate academic needs because I believe that the future will take care of itself.” Internal consistency reliability, assessed using Cronbach's alpha, was .77 for CFC-I and .71 for CFC-F.

Big Five Inventory-II (BFI-2). Assesses individuals' characteristic patterns of thinking, feeling, and behaving—essentially, their personality. It includes five personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism/emotional stability, and openness to experience. In this study, we employed the 30-item version of the inventory (Soto & John, 2017), which consists of six items per subscale. The extraversion domain refers to a person’s tendency to seek social interactions. Individuals scoring high in this domain are sociable, optimistic, affectionate, and active. Agreeableness involves prosocial behaviors such as compassion, respect, and trust. Conscientiousness refers to traits like organization, planning, and goal-directed activity, and is typical of careful, disciplined individuals. Neuroticism is associated with emotional instability; higher scores are linked to anxiety, worry, and sadness. Finally, openness pertains to a person’s enjoyment of new experiences, imagination, and broad interests (Benet-Martínez & John, 1998; Soto & John, 2017). Reliability (Cronbach's alpha) for this sample was as follows: .61 for extraversion, .57 for agreeableness, .70 for conscientiousness, .71 for neuroticism, and .66 for openness.

Raven's Progressive Matrices Test (RPMT). The RPMT is a widely used measure of fluid intelligence (Raven & Court, 1992). It consists of 60 stimulus sheets, each presented individually. Each sheet displays a 3x3 matrix of figures with the bottom-right cell left empty. Participants must select the figure from a set of options that best completes the pattern in the matrix. The participant's score is based on the total number of correct answers.

4. Results

4.1 Cohort characteristics and survey descriptive statistics

Table 1 presents dropout rates and student observations across the two colleges (FCEA and FP). The overall dropout rate in the combined sample is 41.0%, with substantial variation between institutions: FP exhibits a notably higher dropout rate (52.2%) compared to FCEA (32.1%). When examining dropout types, instructional dropout rates are relatively similar between institutions (21.8% in FCEA and 23.3% in FP). However, systemic dropout rates differ considerably, being nearly three times higher in FP (28.9%) than in FCEA (10.3%). Consequently, the distribution of dropout types varies significantly between institutions, with FCEA showing a higher proportion of instructional dropouts (67.9% of all dropouts) compared to FP (44.6% of all dropouts).

From the total sample of 1,318 students, 778 (59.0%) remained enrolled in their original programs. Retention rates varied considerably between colleges, with FCEA retaining a higher proportion of its students (501 out of 738, or 67.9%) compared to FP (277 out of 580, or 47.8%). Among the 540 students who dropped out, 296 (54.8%) were classified as instructional dropouts, while 244 (45.2%) were systemic dropouts.

Table 1 - Dropout rates and student observations by institution and total

	FCEA	FP	Total
Rate (in %)			
Dropout	32,1	52,2	41,0
Instructional	21,8	23,3	22,5
Systemic	10,3	28,9	18,5
Observations (students)			
Dropout	237	303	540
Instructional	161	135	296
Systemic	76	168	244
No dropout	501	277	778
Total	738	580	1318

Source: authors' elaboration based on FCEA-FP Student Survey 2018-2019.

Table 2 presents descriptive statistics (mean and standard deviation) for demographic variables (sex, residence in Montevideo—the country's capital—and age), economic variables (scholarship status and employment status), and personality and cognitive measures (CFC-I, CFC-F, Big Five personality traits, and Raven test scores). To facilitate interpretation and comparison across personality and cognitive measures, all variables were standardized by subtracting the mean and dividing by the standard deviation.

As shown in Table 2, the FP group has a higher percentage of female students, an older student population, and a lower proportion of students from Montevideo, compared to the FCEA group. FP students also score higher on CFC-I and the Big Five traits of agreeableness and openness. In contrast, FCEA students score higher on CFC-F and the Raven test, with no significant differences observed in the remaining Big Five traits.

Across both colleges, dropouts tend to be older than students who remained enrolled, with FCEA dropouts averaging 24.2 years compared to 21.0 for non-dropouts, and FP dropouts averaging 25.9 years versus 24.3 for non-dropouts. Gender patterns differ across institutions: in FCEA, dropouts show a higher proportion of women (58.6%) compared to non-dropouts (49.9%). In contrast, in FP, the high proportion of women remains relatively stable between dropouts (75.2%) and non-dropouts (78.3%). Employment status also varies across institutions: in FCEA, 55.7% of dropouts are employed compared to 34% of non-dropouts. In FP, the difference is smaller, with 48.2% of dropouts employed compared to 44% of non-dropouts. Finally, scholarship recipients are consistently underrepresented among dropouts in both institutions (12.7% versus 23.1% in FCEA, and 13.9% versus 17.8% in FP).

Regarding personality traits and cognitive abilities (all standardized), some notable differences emerge between dropouts and non-dropouts. In FCEA, dropouts exhibit higher levels of CFC-I (0 vs -0.05) and lower levels of CFC-F (0.06 vs 0.25). They also score lower on the Raven test (-0.1 vs 0.3) and show higher openness (-0.07 vs -0.38). In FP, dropouts

display higher CFC-I (0.21 vs -0.11) and lower CFC-F (-0.2 vs -0.14), along with higher extraversion (0.16 vs -0.15) and slightly lower Raven test scores (-0.3 vs -0.1).

These patterns underscore substantial institutional differences in dropout characteristics, reflecting the distinct nature of each institution's student population and academic environment.

Table 2 - Means and standard deviations (in parenthesis) of demographic, economic, personality, and cognitive variables by dropout status and institution

	FCEA			FP		
	No dropout	**Dropout**	**Total**	**No dropout**	**Dropout**	**Total**
Sex (women=1)	49.9	58.6	53.1	78.3	75.2	74.7
	(50.0)	(49.4)	(49.9)	(41.3)	(43.2)	(43.5)
Montevideo	56.1	59.5	56.2	54.5	53.8	51.5
	(49.7)	(49.2)	(49.6)	(49.9)	(49.9)	(50.0)
Age	21.0	24.2	22.1	24.3	25.9	25.8
	(5.01)	(6.77)	(5.89)	(8.85)	(9.21)	(9.48)
Working	34.0	55.7	41.4	44.0	48.2	43.6
	(47.4)	(49.8)	(49.3)	(49.7)	(50.0)	(49.6)
Scholarship	23.1	12.7	20.1	17.8	13.9	14.1
	(42.2)	(33.4)	(40.1)	(38.3)	(34.6)	(34.8)
CFC_I	-0.05	0.00	-0.04	-0.11	0.21	0.03
	(0.92)	(1.05)	(0.95)	(0.98)	(1.08)	(1.04)
CFC_F	0.25	0.06	0.20	-0.14	-0.20	-0.17
	(0.87)	(0.87)	(0.87)	(1.1)	(1.02)	(1.07)
BFI-Extraversion	0.02	0.02	0.02	-0.15	0.16	-0.01
	(1.09)	(0.98)	(1.06)	(0.89)	(0.99)	(0.95)
BFI-Agreeableness	-0.28	-0.06	-0.23	0.18	0.19	0.19
	(0.98)	(0.99)	(0.98)	(0.95)	(1.01)	(0.98)
BFI-Conscientiousness	0.01	-0.02	0.01	0.06	-0.09	-0.01
	(0.90)	(1.09)	(0.95)	(1.03)	(1.06)	(1.04)
BFI-Neuroticism	-0.02	0.03	-0.01	0.09	-0.09	0.01
	(0.97)	(0.96)	(0.97)	(1.02)	(1.03)	(1.03)
BFI-Openness	-0.38	-0.07	-0.31	0.28	0.21	0.25
	(0.92)	(0.99)	(0.94)	(0.94)	(1.03)	(0.98)
Raven	0.3	-0.1	0.2	-0.1	-0.3	-0.2
	(0.8)	(1.1)	(0.9)	(1.0)	(1.1)	(1.0)
Observations	501	237	738	277	303	580

Source: authors' elaboration based on FCEA-FP Student Survey 2018-2019. Note: personality and Raven instruments are standardized.

4.2 Data treatment and analysis plan

Given the dichotomous nature of the dropout decision, we used two methodological approaches to examine the relationship between psychological variables and university students' academic trajectories. First, to address RQ1 and RQ2, we applied a Probit model to estimate the probability of dropout based on a set of independent variables. In this model, the dependent variable equals 1 with probability p if the student drops out and 0 with probability 1–p otherwise. The Probit model is based on the cumulative distribution of a normal variable. Let pi represent the probability of dropout, then:

$$p_i = prob(X) = \emptyset(X_i'\beta)$$

Second, to analyze RQ3, we applied a multinomial Probit model to distinguish between different types of dropout, providing a more nuanced understanding of students' academic decisions. Dropout includes both systemic and instructional types (i.e., not attending FCEA or FP but enrolled in another higher education institution). Dropout status was determined through self-reported responses to the question, "Are you still attending the school in which you enrolled in 2018 (FCEA or FP)?".

The independent variables in both models (X_i') include students' sociodemographic characteristics, such as gender (Female = 1), region (Montevideo = 1), age, employment status (Working = 1) and financial aid status (Has aid = 1). In the Probit model, we also included a variable indicating enrollment in another higher education program (Yes = 1, 0 otherwise). Additionally, the models incorporate personality traits (BFI and CFC) and cognitive abilities (Raven's test). The coefficients for each variable can be interpreted as marginal effects, representing the partial change in the probability of dropout, thereby illustrating how personality traits and intelligence influence dropout likelihood.

4.3 Relationship between sociodemographic and personality variables with dropout. Differences between FCEA and FP

Table 3 presents the results of a Probit regression model examining factors associated with university dropout, incorporating the socio-demographic, economic, fluid intelligence, and personality variables mentioned above. Results indicate that university dropout is influenced not only by sociodemographic and economic factors but also by personality traits and cognitive abilities.

In the overall sample, several sociodemographic and economic variables emerge as significant predictors: being female, older age, and employment status all increase the probability of dropout, whereas scholarship receipt acts as a protective factor, reducing dropout likelihood. Additionally, psychological and cognitive factors significantly predict dropout. Notably, higher scores in CFC-I and extraversion are associated with an increased probability of dropout, suggesting that students with a stronger focus on short-term outcomes and highly extroverted, may be more prone to disengagement. In contrast, cognitive ability as measured by the Raven test, shows a significant negative association with dropout, particularly within FCEA.

A distinct pattern emerges when comparing dropout determinants across institutions, confirming that students in FCEA and FP exhibit different characteristics that shape their academic trajectories. In FP, personality factors are the strongest predictors of dropout, with extraversion and CFC-I showing particularly robust positive associations with dropout probability. In contrast, FCEA exhibits a different pattern, where openness to experience is a significant predictor of dropout, while cognitive ability (Raven test scores) shows a strong negative association with dropout likelihood.

Table 3 - Probability of dropout: Probit model estimation

	Total	FCEA	FP
Sex (women=1)	0.06**	0.06*	-0.03
	(0.028)	(0.033)	(0.049)
Montevideo	-0.03	-0.01	-0.02
	(0.027)	(0.034)	(0.043)
Age	0.01***	0.01***	0.00
	(0.002)	(0.003)	(0.003)
Working	0.09***	0.09**	0.07
	(0.030)	(0.039)	(0.047)
Scholarship	-0.08**	-0.07	-0.02
	(0.037)	(0.046)	(0.060)
CFC_I	0.05**	0.01	0.06*
	(0.020)	(0.030)	(0.028)
CFC_F	-0.02	-0.05	-0.00
	(0.020)	(0.032)	(0.026)
BFI-Extraversion	0.03*	0.01	0.06**
	(0.019)	(0.026)	(0.029)
BFI-Agreeableness	0.02	0.02	0.01
	(0.020)	(0.031)	(0.028)
BFI-Conscientiousness	-0.03	-0.02	-0.02
	(0.021)	(0.032)	(0.028)
BFI-Neuroticism	-0.01	0.02	-0.03
	(0.020)	(0.031)	(0.027)
BFI-Openness	0.04*	0.07***	-0.00
	(0.019)	(0.029)	(0.028)
Raven	-0.07***	-0.10***	-0.04
	(0.024)	(0.035)	(0.032)
Observations	1280	737	543
Pseudo R2	0.0738	0.0952	0.0813

*** p<0.01, ** p<0.05, * p<0.1

Source: authors' elaboration based on FCEA-FP Student Survey 2018-2019.
Note: personality and Raven instruments are standardized.

Table 4 presents the results of a multinomial Probit model that distinguishes between instructional and systemic dropout (with no dropout as the reference category). The findings

reveal distinct influence patterns across sociodemographic factors, personality traits, and cognitive abilities. The analysis demonstrates that different types of dropouts are associated with specific combinations of predictors, highlighting the need for targeted intervention strategies tailored to each dropout type.

Among sociodemographic factors, age and employment status emerge as significant predictors of instructional dropout, with older and employed students showing higher dropout probabilities. Employment status also increases the likelihood of systemic dropout, indicating its broad influence across dropout types. Consistent with the general model (Table 3), scholarship receipt serves as a protective factor against instructional dropout but has no significant effect on systemic dropout. This suggests that financial support might be crucial for preventing attrition related to academic performance. Additionally, the institutional context plays a key role. A dummy variable was included (reference category = FCEA), revealing a strong association between studying in the FP and systemic dropout. This finding aligns with the descriptive statistics presented earlier and highlights the importance of institution-specific factors in understanding dropout patterns.

Individual differences in personality traits and cognitive abilities exhibit distinct patterns across dropout types, with coefficients aligning with theoretical predictions. For instructional dropout, two significant predictors emerge: openness to experience and cognitive ability (as measured by Raven test scores). In contrast, systemic dropout is significantly associated with time perspective factors: both immediate (CFC-I) and future (CFC-F) consideration of consequences significantly predict systemic dropout, with effect directions consistent with theoretical expectations regarding temporal orientation and academic persistence.

Table 4 - Probability of dropout: Probit model estimation

	Instructional	Systemic
Sex (women=1)	0.06**	-0.02
	(0.025)	(0.135)
Montevideo	0.01	-0.04*
	(0.024)	(0.020)
Age	0.01***	0.00
	0.00	(0.002)
Working	0.05*	0.05**
	(0.026)	(0.023)
Scholarship	-0.12***	0.05*
	(0.035)	(0.027)
FPsychology	-0.03	0.16***
	(0.025)	(0.021)
CFC_I	0.01	0.04**
	(0.016)	(0.017)
CFC_F	0.02	-0.03*
	(0.016)	(0.018)
BFI-Extraversion	0.01	0.03
	(0.017)	(0.017)
BFI-Agreeableness	0.01	-0.00
	(0.017)	(0.018)
BFI-Conscientiousness	-0.02	-0.00
	(0.017)	(0.018)
BFI-Neuroticism	-0.01	0.00
	(0.017)	(0.017)
BFI-Openness	0.03*	-0.01
	(0.018)	(0.016)
Raven	-0.04*	-0.02
	(0.021)	(0.019)
Observations	1280	
Log likelihood	-1079.6	

*** p<0.01, ** p<0.05, * p<0.1

Source: authors' elaboration based on FCEA-FP Student Survey 2018-2019.
Note: personality and Raven instruments are standardized.

5. Discussion

This study aimed to provide new insights into the psychological and cognitive factors that shape university dropout patterns, contributing to the growing literature on the determinants of academic persistence. We focused on students from two colleges - economics and psychology- and modeled dropout probability based on sociodemographic and economic factors, Big Five personality traits, future orientation (Consideration of Future

Consequences), and cognitive abilities, measured by Raven's Progressive Matrices. The findings highlight both common and discipline-specific predictors of dropout, emphasizing the role of individual differences in shaping academic trajectories. The discussion is structured around the three research questions outlined in the introduction, addressing the relative influence of cognitive abilities and personality traits, the distinction between instructional and systemic dropout, and the potential implications for higher education policy.

In response to Q1, our findings highlight the significant association between personality traits and dropout decisions. Particularly, higher scores in CFC-I, which reflect a stronger focus on short-term rewards, are associated with an increased dropout probability. Similarly, higher openness to experience and extraversion, as measured by the Big Five Inventory (BFI), are linked to greater dropout likelihood. In contrast, cognitive ability, as assessed by Raven's Progressive Matrices, exhibits a strong negative association with dropout, reinforcing prior findings that highlight the protective role of fluid intelligence in academic persistence (Chamorro-Premuzic, 2007, Kaufman & Lichtenberger, 2005, Lechner et al., 2017). Thus, our study extends this body of research by demonstrating that the relationship between psychological processes, such as future consequences and Big Five personality traits and academic performance, holds even when controlling for an index cognitive ability related to abstract thinking and fluid intelligence. Students who prioritize short-term outcomes may be more likely to withdraw from long-term academic commitments. By simultaneously accounting for key psychological dimensions, our study provides a more comprehensive perspective on the factors shaping academic persistence.

To address Q2, and as suggested by Vedel et al. (2015), we estimated separate models for each institution, revealing distinct predictive patterns. Previous research has established the relevance of personality traits in academic persistence (Poropat, 2009; Mammadov, 2022). Our findings show that the influence of specific traits, such as extraversion and openness, traits previously shown to be weakly related to academic performance (O'Connor & Paunonen, 2007), may vary across academic disciplines, replicating the findings of Vedel et al. (2015). This highlights the need for discipline-specific retention strategies, as the psychological factors shaping dropout decisions may differ depending on the nature of the academic program. In Psychology (FP), personality traits play a dominant role in dropout likelihood, with CFC-I and extraversion exhibiting particularly robust positive associations, potentially serving as protective factors in a context demanding extensive reading and self-regulation. In contrast, Economics (FCEA) presents a different pattern, where openness to experience emerges as a significant predictor and cognitive ability demonstrates a strong negative association with dropout probability (1% significance), suggesting a greater emphasis on quantitative reasoning. The observed differences suggest that dropout prevention policies should be tailored to the specific characteristics and needs of students in each academic discipline. In contrast with previous results (O'Connor & Paunonen, 2007; Mammadov, 2022) we did not find evidence of any contribution of the trait conscientiousness as a predictor of dropout. This effect may be related to the fact that our study controls for fluid intelligence and future orientation, psychological processes that are highly correlated but may be more specific to the modeling of dropout decisions.

This research extends the existing literature on dropout determinants (Helland & Strømme, 2024; Ortiz-Lozano et al., 2023; Herbaut, 2021; Cannistrà et al., 2021) by innovatively distinguishing between systemic and instructional dropout while emphasizing the importance of identifying early predictors of student dropout. In this sense, we address Q3 using a multinomial model, highlighting the institutional influence on dropout type. In particular, we find a strong association between studying in FP and systemic dropout, whereas instructional dropout, which involves remaining in the educational system, does not show this pattern. Our results suggest that personality traits and cognitive abilities exhibit distinct relationships with dropout type. Systemic dropout is significantly associated with time perspective factors, as both immediate (CFC-I) and future (CFC-F) consideration of consequences emerge as significant predictors. These results align with theoretical expectations regarding the influence of temporal orientation on academic achievement (Andre et al., 2018). Furthermore, our study underscores the critical role of future orientation in dropout decisions. Students with a stronger future orientation may demonstrate greater resilience to academic challenges and institutional barriers, reinforcing the argument that time perspective is a key determinant of educational persistence (Loose & Vasquez-Echeverría, 2023; Zimbardo & Boyd, 1999).

Meanwhile, higher openness is associated with an increased likelihood of instructional dropout. In contrast, higher cognitive ability acts as a protective factor, consistent with theoretical expectations about the role of cognitive resources in academic success. These distinct patterns of association underscore that instructional and systemic dropout represent different phenomena requiring tailored interventions. While instructional dropout appears to be more closely linked to cognitive abilities and openness to experience, systemic dropout is more strongly related to students' considerations of temporal consequences. This distinction suggests that addressing instructional dropout may require targeted academic support and strategies that account for the influence of personality traits on learning approaches. In contrast, reducing systemic dropout may benefit from interventions that help students better evaluate the immediate and future consequences of their academic decisions.

Implications for Higher Education Policy

These findings hold significant implications for higher education policy, particularly in the design of targeted retention interventions. Such interventions should clearly define their scope based on both the academic discipline and the type of dropout they aim to address. Universities could benefit from incorporating comprehensive psychological assessments into early student support programs, enabling personalized interventions that enhance socioemotional skills, future-oriented thinking, and academic resilience. Additionally, discipline-specific support strategies may be necessary to address the unique challenges faced by students in different fields of study.

For instance, FP could emphasize time management training, while FCEA might consider providing additional academic resources for students struggling with abstract reasoning. Moreover, institutional policies aimed at reducing systemic barriers -such as flexible grading

schemes, adaptive learning platforms, and proactive academic advising- could help mitigate the impact of cognitive and personality-related dropout risks.

6. Limitations

One of the main limitations of this study is the lack of precise data on when dropout occurred, which prevents a consistent temporal ordering of variables across participants. Additionally, while data were collected when students were in their second year, dropout may have occurred later. Longitudinal research would be needed to better characterize dropout decisions and students' academic trajectories. Second, several factors influencing dropout decisions were not analyzed in this study and warrant future research. For example, we did not measure factors related to university experience (Tinto, 1987; Diaz Lema et al., 2024; Richardson et al., 2012) such as the quality of the educational environment or students' sense of belonging. Future studies could focus on estimating the relative influence of these variables. Third, given the substantial proportion of instructional dropout, further research should explore the specific reasons behind each dropout type. Fourth, as most variables in this study -including dropout- were self-reported, greater reliance on administrative records to quantify academic variables would strengthen future analyses. Finally, a larger study including additional schools within the university could provide a clearer understanding of personality differences across disciplines and their role in dropout decisions.

References

Acuff, S., Soltis, K., Dennhardt, A., Borsari, B., Martens, M., & Murphy, J. G. (2017). Future so bright? Delay discounting and consideration of future consequences predict academic performance among college drinkers. Experimental and Clinical Psychopharmacology, 25(5), 412–421.

Andre, L., Van Vianen, A. E. M., Peetsma, T. T. D., & Oort, F. J. (2018). Motivational power of future time perspective: Meta-analyses in education, work, and health. PLoS ONE, 13.

Alvarez-Nuñez, L., Vásquez-Echeverría, A., & Antino, M. (2023). Consideration of future consequences: evidence of weekly fluctuations and domain-specificity in association with health, academic, and work outcomes. Current Psychology, 42(32), 28406–28416. https://doi.org/10.1007/s12144-022-03910-5

Arcidiacono, P., Hotz, V. J., & Kang, S. (2012). Modeling college major choices using elicited measures of expectations and counterfactuals. Journal of Econometrics, 166(1), 3-16.

Balloo, K., Pauli, R., & Worrell, M. (2017). Undergraduates' personal circumstances, expectations and reasons for attending university. Studies in Higher Education, 42(8), 1373-1384.

Benet-Martínez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait-multimethod analyses of the Big Five in Spanish and English. Journal of Personality and Social Psychology, 75(3), 729-750.

Cannistrà, M., Masci, C., Ieva, F., Agasisti, T., & Paganoni, A. M. (2021). Early-predicting dropout of university students: an application of innovative multilevel machine learning and statistical techniques. Studies in Higher Education, 47(9), 1935–1956. https://doi.org/10.1080/03075079.2021.2018415

Chiarino, Nicolás., Rodríguez Enríquez, Carolina., Curione, Karina., Machado, Alina., Bonilla, Micaela., Aspirot, Laura., Garófalo, Lucía., y Olveira, Bruna. (2024). Abandono y permanencia estudiantil en universidades de Latinoamérica y el Caribe: Una revisión sistemática mixta. Revista Actualidades Investigativas en Educación, 24(2), 1-37. https://doi.org/10.15517/aie.v24i2.57306

Diaz Lema, M., Vooren, M., Cannistrà, M., van Klaveren, C., Agasisti, T., & Cornelisz, I. (2024). Predicting dropout in Higher Education across borders. Studies in higher education, 49(1), 141-156.

Galve-González, C., Bernardo, A. B., & Núnez, J. C. (2024). Trayectorias académicas: El papel del compromiso como mediador en la decisión de abandono o permanencia universitaria. Revista de psicodidáctica, 29(2), 130-138.

Helland, H., & Strømme, T. B. (2024). Social inequality in completion rates in higher education: Heterogeneity in educational fields. The British Journal of Sociology, 75(2), 201-218.

Herbaut, E. (2021). Overcoming failure in higher education: Social inequalities and compensatory advantage in dropout patterns. Acta Sociologica, 64(4), 383-402.

Hovdhaugen, E. (2009). Transfer and dropout: Different forms of student departure in Norway. Studies in Higher Education, 34(1), 1-17.

Joireman, J. A. (1999). Additional Evidence for Validity of the Consideration of Future Consequences Scale in an Academic Setting. Psychological Reports, 84(3).

Joireman, J., Shaffer, M. J., Balliet, D., & Strathman, A. (2012). Promotion Orientation Explains Why Future-Oriented People Exercise and Eat Healthy: Evidence From the Two-Factor Consideration of Future Consequences-14 Scale. Personality and Social Psychology Bulletin, 38(10), 1272-1287.

Kaufman, A., & Lichtenberger, E. (2005). Assessing adolescent and adult intelligence (3rd ed.). Boston: Allyn & Bacon

Lobo, A., & Gurney, L. (2013). What did they expect? Exploring a link between students' expectations, attendance and attrition on English language enhancement courses. Journal of Further and Higher Education, 38(5), 730–754. https://doi.org/10.1080/0309877X.2013.817002

Loose, T., & Vasquez-Echeverría, A. (2023). Academic performance and feelings of belonging: Indirect effects of time perspective through motivational processes. Current Psychology, 42(6), 4531-4542.

Mammadov, S. (2022). Big Five personality traits and academic performance: A meta-analysis. Journal of personality, 90(2), 222-255.

Molnár, G., & Kocsis, Á. (2023). Cognitive and non-cognitive predictors of academic success in higher education: a large-scale longitudinal study. Studies in Higher Education, 49(9), 1610–1624. https://doi.org/10.1080/03075079.2023.2271513

Munizaga, F., Cifuentes, M., & Beltrán, A. (2018). Retención y abandono estudiantil en la Educación Superior Universitaria en América Latina y el Caribe: Una revisión sistemática. Archivos Analíticos de Políticas Educativas, 26, 61. https://doi.org/10.14507/epaa.26.3348

Murphy, L., Cadogan, E., & Dockray, S. (2020). The Consideration of Future Consequences: Evidence for Domain Specificity Across Five Life Domains. Personality and Social Psychology Bulletin, 46(5), 663-678. https://doi.org/10.1177/0146167219873478

Nemtcan, E., Sæle, R. G., Gamst-Klaussen, T., & Svartdal, F. (2020, December). Drop-out and transfer-out intentions: The role of socio-cognitive factors. In Frontiers in Education (Vol. 5, p. 606291). Frontiers Media SA.

O'Connor, M. C., & Paunonen, S. V. (2007). Big Five personality predictors of post-secondary academic performance. Personality and Individual Differences, 43(5), 971–990.

OECD (2022), Education at a Glance 2022: OECD Indicators, OECD Publishing, Paris, https://doi.org/10.1787/3197152b-en.

Ortiz-Lozano, J. M., Aparicio-Chueca, P., Triadó-Ivern, X. M., & Arroyo-Barrigüete, J. L. (2023). Early dropout predictors in social sciences and management degree students. Studies in Higher Education, 49(8), 1303–1316. https://doi.org/10.1080/03075079.2023.2264343

Ortiz, E. A., & Dehon, C. (2013). Roads to success in the Belgian French community's higher education system: Predictors of dropout and degree completion at the Université Libre de Bruxelles. Research in Higher Education, 54(6), 693-723.

Peters, B. R., Joireman, J., & Ridgway, R. L. (2005). Individual differences in the consideration of future consequences scale correlate with sleep habits, sleep quality, and GPA in university students. Psychological Reports, 96(3), 817-824.

Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. Psychological Bulletin, 135(2), 322.

Raven, J. C. & Court, J. H. (1992). Manual for Raven's standard progressive matrices, 1992 Edition. Windsor: NFER Nelson.

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: a systematic review and meta-analysis. Psychological Bulletin, 138(2), 353.

Soto, C., & John, O. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. Journal of Personality and Social Psychology, 113(1), 117.

Stinebrickner, T., & Stinebrickner, R. (2012). Learning about academic ability and the college dropout decision. Journal of Labor Economics, 30(4), 707-748.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distant outcomes of behavior. Journal of Personality and Social Psychology, 66(4), 742-752.

Tinto, V. (1987). Leaving College: Rethinking the Causes and Cures for Student Attrition. Chicago: University of Chicago Press.

Tinto, V. (1993). Building community. Liberal education, 79(4), 16-21.

Trapmann, S., Hell, B., Hirn, J. O. W., & Schuler, H. (2007). Meta-analysis of the relationship between the Big Five and academic success at university. Journal of Psychology, 215(2), 132–151.

Udelar (2022). Estadísticas Básicas 2020 de la Universidad de la República. Dirección General de Planeamiento, Universidad de la República. Montevideo, Uruguay.

Udelar (2023). La Udelar desde una perspectiva de género. Dirección General de Planeamiento, Universidad de la República. Montevideo, Uruguay.

Ulriksen, L., Madsen, L. M., & Holmegaard, H. T. (2010). What do we know about explanations for drop out/opt out among young people from STM higher education programmes?. Studies in science education, 46(2), 209-244.

UNESCO. (2021). Los efectos de la pandemia COVID-19 sobre la deserción universitaria: desgaste docente y bienestar psicológico estudiantil. Revista Educación Superior y Sociedad, 33(2), 402-421. https://doi.org/10.54674/ess.v33i2.360

Vásquez-Echeverría, A., Antino, M., Alvarez-Nuñez, L., & Rodríguez-Muñoz, A. (2018). Evidence for the reliability and factor solution of the CFCS-14 in Spanish: A multi-method validation in Spain and Uruguay. Personality and Individual Differences, 123, 171-175.

Vedel, A., Thomsen, D. K., & Larsen, L. (2015). Personality, academic majors and performance: Revealing complex patterns. Personality and Individual Differences, 85, 69–76.

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. Journal of Personality and Social Psychology, 77(6), 1271–1288. https://doi.org/10.1037/0022-