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*Corresponding author: María Verónica Santelices, Millenium Nucleus "Experience of Students in Higher Education in Chile: Expectations and Realities" Pontificia Universidad Católica de Chile, Av. Vicuña Mackenna 4860, Macul, La Florida, Región Metropolitana, Santiago 8150215, Chile; Facultad de Educación, Pontificia Universidad Católica de Chile, Santiago, Chile
E-mail: vsanteli@uc.cl

Reviewing editor:
Lily Zeng, Faculty of Education (CETL), The University of Hong Kong, Pokfulam, Hong Kong, SAR China

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Academic performance and adjustment of first-generation students to higher education: A systematic review

María José López^{1,2}, María Verónica Santelices^{1,2*} and Carmen Maura Taveras²

Abstract: Scholarly work conducted before 2010 consistently reported a gap between first-generation and continuing-generation students in college success, as measured by grades, persistence, and graduation rates. Through a systematic literature review, this study aimed to examine the most recent findings, from 2010 until 2020, regarding the academic adjustment process of first-generation students to higher education institutions and the institutional factors that help them in the process. The results report lower performance of first-generation (FG) students and compared to that of continuing-generation (CG) students and measured by grades and persistence. When looking at other variables, such as learning outcomes, intellectual development, learning skills, integration and engagement with the academic environment, we find scarce and mixed evidence. There is also an increased interest in the academic process, and not just in describing academic outcomes of first-generation students. These findings suggest that interventions promoting social belonging, support from peers, parents' involvement and a welcoming campus climate should be fostered by institutions interested in the access and graduation of FG students.

Subjects: Study of Higher Education; Teaching & Learning

Keywords: first-generation students; higher education; academic outcomes; academic adjustment; transition; systematic review

ABOUT THE AUTHORS

María José López is a research assistant in the research project "Millenium Nucleus Students' Experience of Higher Education in Chile". Her research examines the adjustment process of first-generation students to higher education.

María Verónica Santelices, PhD, is an Associate Professor in the Faculty of Education of Pontificia Universidad Católica de Chile. Her research combines measurement and educational policies, focusing on access, transition and experience in higher education, including the relationship between persistence and financial aid, with a special focus on first-generation and low-income students.

Carmen Maura Taveras is a PhD(C) student at the School of Education at Pontificia Universidad Católica de Chile. She received a Masters degree in Learning Assessment at the School of Education at Pontificia Universidad Católica de Chile. Her research combines quantitative methods to provide evidence on how students' and teachers' decisions are related to socioemotional or socioeconomic factors.



1. Introduction

In the context of higher education massification, institutions face new challenges to meet the needs of new student cohorts. Those challenges include ensuring that all admitted students succeed academically. Using data from UNESCO, Calderón (2018) reported that in 2010 there were 181.5 million students enrolled in higher education institutions compared to 214.1 million in 2015 worldwide. This represents an increase of 18% over this period. The massification of higher education has implied a transformation of the students' profile. According to OECD, (2019), the enrollment of individuals whose parents have not attained tertiary education is growing but it is still under-represented among new entrants to undergraduate programs.

Defined as the first individuals in their nuclear families to attend a postsecondary institution (Hsiao, 1992; W. E. Inman & Mayes, 1999), first-generation or first-in-family students (henceforth FG students) are more likely to intersect with groups of interest, such as low socioeconomic status, and pertaining to an ethnic minority group (Ward et al., 2012).

For many FG students, college success has not kept pace with college entrance. Despite the increasing enrollment of low-income and FG students to higher education between 2010 and 2020 (OECD, 2015, 2019), a gap in college success, as measured by grades, persistence, and graduation rates remains (Engle & Tinto, 2008; Ishitani, 2006; Krogstad & Fry, 2015; Pascarella et al., 2004; Strayhorn, 2006). RTI International (2019) showed that, in the USA context, 6 years after first entering postsecondary education in academic year 2003–04, 56% of FG students had not earned any credential, compared to 40% of continuing students (henceforth CG students).

These disparities in retention and graduation translated in difficulties in finding a job that is more competitive in the job market hierarchy (Davis, 2010) and also involved important financial debts (Chen & Carroll, 2005; Dumais & Ward, 2010). Governments and higher education institutions have increasingly invested in programs that attempt to improve, not only the access but also the overall transition of low-income and FG student including their academic performance. Positive results from studies that examined the results of specific interventions over the academic outcomes and overall experience of more disadvantaged students in subsequent years, may be an indicator of their success. These positive findings included participants of Student Support Services' programs (Chaney et al., 1997) and Upward Bound in the United States showing better performance compared to a non-participant group (Seftor et al., 2009). In addition, recent findings from (Santelices, 2022) showed positive results in the Chilean context, by showing students admitted in 2007 via access programs exhibit no differences in persistence over the first three years of college when compared to similar students admitted through the regular pathway.

In addition, more recent studies seem to support the hypothesis of improved transition experience for FG students at least in terms of social and institutional adjustment (Lopez & Santelices, 2022). This evidence sparks interest in exploring whether something similar may be happening with the academic experience of FG students.

This article seeks to review recent studies regarding the academic experience of FG students transitioning to higher education. As described above, there are reasons to expect changes in the academic experience and performance of FG students. Academic experience could be changing because of interventions put in place by institutions, better academic preparation of FG students and/or a better social and institutional adjustment process when transitioning to higher education. We explore particularly how academic outcomes have been studied and discuss the diversification this scholarly work has experienced.

The article is organized as follows. First, we provide background regarding the academic outcomes of FG students prior to the period addressed by this review to establish a baseline with which to compare the main findings from our own systematic review. Then, we present the theoretical framework used for analyzing the academic outcomes and adjustment of FG students.

Next, we explain the research question and methodological steps followed to conduct the systematic review within articles published between 2010 and 2020. Our results are presented in the fourth section. Lastly, we discuss results and present main findings.

2. Literature review

2.1. *What do we know about the academic outcomes of first-generation students?*

In terms of academic achievement, a large amount of evidence prior to 2010 showed that FG students tended to achieve lower grades than CG students (Strayhorn, 2006), leading to an academic achievement gap that emerged as early as the end of the first year (Chen & Carroll, 2005; Dennis et al., 2005; Jenkins et al., 2009; Lohfink & Paulsen, 2005; Pascarella et al., 2004).

In terms of their persistence and attrition, FG students were less likely to complete their degrees in the expected timeframe, more likely to leave higher education prematurely and without a degree, and less likely to return, than their CG peers (Ayala & Striplen, 2002; Chen & Carroll, 2005; Engle & Tinto, 2008; Ishitani, 2006; Nunez & Cuccaro-Alamin, 1998; Pascarella et al., 2004; Vargas, 2004; Warburton et al., 2001), even when controlling for high school preparation, race, gender, ethnicity, and socioeconomic status (Choy, 2001). They also showed higher retention rates, which ultimately means that 4- and 6-year graduation rates of FG students are lower than those of CG students (Ishitani, 2003, 2006; P. Terenzini et al., 1996).

Regarding their learning outcomes and skills, despite the evidence on the time they put into studying was mixed (see Bui, 2002), FG students were found to make less progress in their learning and intellectual development (Pike & Kuh, 2005), and to be more likely to have difficulties choosing a major (Chen & Carroll, 2005; Pascarella et al., 2004). They were also found to score lower on critical thinking ability exams when entering college (P. Terenzini et al., 1996), and complete fewer credit hours (Majer, 2009; Pascarella et al., 2004).

2.2. *What factors influence the academic outcomes of first-generation students?*

Research conducted before 2010 explored how the social, cultural, and economic background of FG students was associated to their academic adjustment, particularly in terms of academic preparation, college readiness and college “know how” (Reay et al., 2005). FG students were more likely to attend lower quality high-schools (P. Terenzini et al., 1996; Warburton et al., 2001) and to be less academically prepared (Massey et al., 2006; McCarron & Inkelas, 2006; P. T. Terenzini et al., 2001; Perna, 2005). In addition, substantial research conducted before 2010 suggested that FG students arrived at college academically underprepared with relatively fewer effective studying methods, learning strategies, and reasoning skills to process new information for retention and retrieval at the postsecondary level (e.g., Choy, 2001; Pascarella et al., 2004).

In addition, some suggested that unequal academic outcomes and experiences were associated with pre-college lower academic aspirations (Pike & Kuh, 2005). It has been suggested that those families who had generational experience of university, an educational memory, inculcated a belief that university is a predetermined choice and therefore a non-decision (Ball et al., 2002). This is connected to the fact that FG students developed lower degree aspirations and much later than CG students (P. Terenzini et al., 1996). Cloete (2001) found that parents belonging to lower socio-economic groups did not put high value on their children’s education and did not motivate them to participate in academic activities. However, past research has found that parental expectations were a key motivator to attend college, particularly among FG college students’ families (Dennis et al., 2005).

These students also reported more confusion over faculty expectations (compared to CG students): struggling to understand professor expectations in terms of deadlines, writing standards, and style guides (Collier & Morgan, 2008). Reid and Moore (2008) revealed that, despite their excellent high-school records, FG students reported feeling overwhelmed in college courses and

unprepared to meet deadlines, fulfill paper length requirements, and utilize appropriate evidence in their writing assignments. Likewise, they were more likely to find little connection with the classroom curriculum and their own lives, found less validation from faculty, and thus questioned their place in the academic environment (Borrego, 2001). This perception of invisibility to professors was also frequent among underrepresented students (Hurtado et al., 2007).

Other studies found that FG students may have had limited time to spend studying, as they were more likely to have greater responsibilities outside of the college environment, such as working (Billson & Terry, 1982; Pike & Kuh, 2005; Singh et al., 2004) and family obligations, responsibilities that compete with time and attention for college (Richardson & Skinner, 1992). They were also more likely to live off campus (Pike & Kuh, 2005) and maintain close ties with family members and friends who were not involved in higher education (P. Terenzini et al., 1996; Pascarella et al., 2004). Somers et al. (2004) also noted the persistence of FG students was more sensitive to financial aid and averse to student loans than their peers. In sum, these behaviors were associated with lower academic achievement (Davis, 2010), making it difficult for them to gain information about social and academic opportunities, and increasing the probability of dropping out (P. Inman & Pascarella, 1998; Pike & Kuh, 2005).

Conversely, a different line of research conducted also in the period pre-2010 suggested that, due to prior challenging circumstances and life experiences, FG students exhibited pre-existing intrinsic self-motivation, perseverance, resilience, and determination strengths. These characteristics made them likely to succeed when given the opportunity (Hicks & Dennis, 2005; Komada, 2002). For instance, in a study comparing FG students with students whose parents were college-educated, Ramos-Sanchez and Nichols (2007) found that those students who reported a high academic self-efficacy also reported an improved college adjustment. Similarly, both Walkerdine et al. (2001) and Reay et al. (2009) discussed how the emotional dispositions and strengths developed by working-class students assisted them to cope with the isolation and difficulties faced during the transitioning to higher education.

Variables related to the academic adjustment and performance of FG students included sense of fit, family, social and institutional support. Studies up to 2010 established a correlation between the level of social support and FG students' ability to achieve success within the academic environment (Phinney & Haas, 2003). Research in this area examined relationship-specific domains of support, for example, the differential impact of family and peer support on college students' psychological well-being and academic outcomes (Dennis et al., 2005). One study demonstrated that the social class achievement gap in college GPAs was mediated by the lack of academic fit perceived by students from lower social class backgrounds (Ostrove & Long, 2007). Moreover, research before 2010 showed that feelings of isolation, exclusion, and marginalization, as well as the lesser involvement, participation and interactions presented by FG students had implications for their academic performance (Croizet & Claire, 1998; Ostrove & Long, 2007; Pascarella et al., 2004). Research suggested that strong interpersonal support systems may narrow the gap between FG and CG students (Dennis et al., 2005).

All of the above portrayed FG students as a group where only a disproportionately low number succeed in higher education (Pike & Kuh, 2005), attaining their self-determined academic goals and aspirations at lower rates (McCarron & Inkelas, 2006). In addition to the identified differences during the period before 2010 between FG and CG students in terms of academic performance, recent scholarly work has shown mixed evidence regarding the social and institutional dimensions of these students' adjustment to higher education (Author). Do these mixed results in the social and institutional spheres translate into different, mixed or better academic outcomes for FG students? This article aims to contribute to the field by identifying the most current (post 2010) findings regarding the academic outcomes and academic adjustment of FG students and deepening into their possible correlated variables. To do so, this systematic review synthesizes the literature published between 2010 and 2020, which allows us to understand the differences and

similarities between FG and CG students in terms of their transition and adaptation to the academic environment of higher education.

3. Theoretical approach

This study conceptualizes academic adjustment, first, drawing on Nicholson's definition of adjustment as the third phase of the transition process from secondary education, following the preparation and encounter phases (1990). At this stage, individuals adopt the necessary attitudes and behaviors that allow them to integrate into the new environment. After this phase, individuals should acquire "sustained trust, commitment and effectiveness with tasks and people... to realize their potential in their roles" (p. 89) and hence achieve the stabilization phase.

To bring Nicholson's (1990) dynamic concept into the higher education sphere, Credé and Niehorster's (2012) defined adjustment as a multidimensional construct that captures the ability of the student to adapt to the multidimensional environment of college. They based their definition on evidence obtained from a meta-analysis of studies using the Student Adaptation to College Questionnaire (SACQ). This conceptualization highlights the challenges students cope with in the new context (Baker & Siryk, 1989; Wintre et al., 2009). The overcoming of diverse challenges is expected to lead to Nicholson's stabilization phase, which should be reflected in student's academic success as measured by grades and persistence.

Bean and Metzner's (1985) expanded on the work from Nicholson (1990) as well as Credé and Niehorster (2012) by focusing on the subgroup and variable of interest to this particular study, thus, non-traditional students (i.e. first-generation students in our study) and academic performance during the adjustment period. According to Bean and Metzner's (1985), academic outcomes including retention are directly influenced by individual socio-demographic variables, academic variables (study habits, academic advising, major certainty, absenteeism), environmental variables including financial and family-related variables (finances, hours of employment, outside encouragement, family responsibilities), and psychological variables (satisfaction, goal commitment, utility, and stress), and—on a less direct way—social variables. The variable categorization suggested by these authors (Metzner & Bean, 1987; Nicholson, 1990) will be closely followed in our analysis.

4. Research questions

This article aims to systematically examine findings from articles published between 2010 and 2020 regarding the adjustment process of FG students to the academic environment of higher education. The specific research questions are

RQ1. How has the academic performance of FG students during the adjustment phase been studied?

RQ2. What characterizes the academic performance of FG students during the adjustment phase?

RQ3. What factors influence the academic performance of FG students during the adjustment phase?

5. Methodology

This study analyzes a subgroup of articles found through a larger systematic review research project that looked for studies on the transition and adjustment of FG students in higher education institutions published between 2010 and 2020. The search was conducted using Web of Science, Scielo Citation Index, and Scopus databases. Our keywords included "first-generation," "first-in-family," "student," "higher education," "transition," "trajectory," "experience," and "adjustment."

The search resulted in 724 articles that were screened by three judges. They applied the inclusion and exclusion criteria after reading the articles' title and abstracts.

Other systematic reviews published during this time examined very different aspects of the FG students' higher education experience such as the process of learning (Ives & Montoya, 2020), the role of networks (Mishra, 2020) or the effects on causal mobility (Mocca et al., 2019), or delved into the experience of FG students in a very specific context (i.e., STEM disciplines in HBCUs in Hicks & Wood, 2016).

Selection criteria included (1) articles published in 2010–2020 because of the expansion of higher education experienced globally, (2) articles whose main population of study were FG students, (3) articles published in peer-reviewed journals as a quality indicator. An additional quality criteria of the study was that we only included studies that provided enough details of the methods employed, participants and findings. Exclusion criteria were applied for cases where (1) FSG were not addressed in the main findings, (2) main findings referred to a transition stage different from adjustment, (3) articles implemented qualitative or mixed methodology. The agreement on the acceptance of an article, among at least two judges, reached 84% and resulted in 358 studies excluded. These mostly referred to first-generation immigrants who may or may not be higher education students. The selection of quantitative studies among the remaining 366 studies resulted in a total of 80 accepted articles. We focused on quantitative studies as they provide generalizable and comparable results across groups and variables.

We extracted relevant information from the included articles and formed a database, which included: (a) *General information of the article*: author(s), study title, year of publication, journal, and main topic; (b) *Design*: research objective(s), question(s) and/or hypothesis, conceptual or theoretical framework(s), methodology, sample details and definition of first-generation student used, dependent and independent variables used; (c) *Findings*: summary of the overall results and conclusions that were relevant to first-generation students' adjustment to higher education. Next, we developed a codebook including relevant dimensions of the adjustment to higher education found in the previous literature, such as "Academic", "Social", "Institutional", and "Personal" adjustment (Nicholson, 1990). The articles were categorized based on the adjustment dimension(s) addressed by their dependent variable(s), as a way to explore how frequently the topics had been studied; they could address more than one type of adjustment at a time. While 60% of the studies reported findings regarding the academic adjustment of first-generation students ($n=48$), 50% addressed personal adjustment ($n=40$), 27% looked at social adjustment ($n=21$), and 21% reported findings on institutional adjustment ($n=17$).

5.1. Studies' main characteristics

From those 80 quantitative studies, we focused on those articles where the main dependent variables were the academic outcomes and academic adjustment of FG students ($N=48$; 60%). Out of these 48 articles, a total of 9 (18.75%; Deutschlander, 2019; Harackiewicz et al., 2016; Jury et al., 2015; Marksteiner et al., 2019; Parnes et al., 2020; Stephens et al., 2014; Tibbetts et al., 2016, 2018; Townsend et al., 2019) developed a causal approach—including quasi-experiments and randomized control trials—while the remaining 39 (81,25%) were mainly based on descriptive analysis that compared the results and outcomes of different groups (including statistical tests like ANOVA, MANOVA, ANCOVA, χ^2 , T-tests, OLS regressions, logistic regressions, hierarchical regressions, and moderation-mediation analysis). A total of 18 (37.5%) studies implemented a longitudinal analysis (Canning et al., 2019; Culver et al., 2019; Deutschlander, 2019; Dika & D'Amico, 2016; Garriott et al., 2017; Grayson, 2011; Harackiewicz et al., 2016; Kilgo et al., 2018; Marksteiner et al., 2019; Padgett et al., 2012; Parnes et al., 2020; Phillips et al., 2020; Stephens et al., 2014; Tibbetts et al., 2016, 2018; Townsend et al., 2019; Veldman et al., 2019; Wittner et al., 2019).

The dependent variables regarding academic adjustment were grouped into five categories. Note that some studies may have included measures for more than one category. Percentages presented below are out of the 48 (100%) articles which focused on academic adjustment.

- (A) Most studies used academic achievement (i.e., grades) as a measure for academic adjustment ($n=30$; 62.5%; Afeli et al., 2018; Almeida et al., 2019; Aspelmeier et al., 2012; Bruno et al., 2019; Burger & Naude, 2019; Canning et al., 2019; Darnon et al., 2018; Eveland, 2019; Garza & Fullerton, 2018; Grayson, 2011; Harackiewicz et al., 2016; Herrmann & Varnum, 2018; Hodge et al., 2018; House et al., 2020; Hunt et al., 2018; Jury et al., 2015; Marksteiner et al., 2019; Parnes et al., 2020; Phillips et al., 2020; Próspero et al., 2012; Reed et al., 2019; Roksa & Kinsley, 2019; Roksa et al., 2020; Simmons et al., 2018; Stephens et al., 2012, 2014; Tibbetts et al., 2016; Townsend et al., 2019; Tucker et al., 2020; Veldman et al., 2019). We also included in this group of measures the officially reported cumulative grade point averages, end-of-semester grades, results in math tasks (e.g., arithmetic) and self-reported grades. Most causal studies referred to this type of dependent variable (7 out of 9). See Table 1.
- (B) Studies also used persistence variables ($n=12$; 25%) including one term persistence, one-year persistence, persistence in the first year, intention to persist, intention to drop out (Bettencourt et al., 2020; Canning et al., 2019; Deutschlander, 2019; Dika & D'Amico, 2016; Garriott et al., 2017; Garza & Fullerton, 2018; Marksteiner et al., 2019; Roksa & Kinsley, 2019; Roksa et al., 2020; Soria & Stebleton, 2012; Tucker et al., 2020; Wittner et al., 2019). All studies in this section were descriptive with one exception.
- (C) To a lesser extent, studies made use of varied measures of learning outcomes, intellectual development and learning skills ($n=7$; 14.58%; Antonelli et al., 2020; Culver et al., 2019; Dong, 2019; Hunt et al., 2018; Kilgo et al., 2018; Padgett et al., 2012; Wright, 2019).
- (D) An even smaller group of studies made use of measures of academic adjustment, engagement, and integration ($n=7$; 14.58%; Adams et al., 2016; Afeli et al., 2018; Aspelmeier et al., 2012; Canning et al., 2019; Hodge et al., 2018; Rodríguez et al., 2018; Veldman et al., 2019). These measures comprised a wide range of areas related to the degree to which students are integrated into the academic environment of their institutions. In this category, we also added the specific measures of awareness of institutional research activities and perception about research, used by Rodríguez et al. (2018).
- (E) A last group of variables included measures of educational goals and expectations ($n=6$; 12.5%; Burger & Naude, 2019; Garriott & Nisle, 2018; Garriott et al., 2015; Simmons et al., 2018; Thompson et al., 2014; Tibbetts et al., 2018) (i.e. perceived academic preparedness, job expectations, perceived academic goal progress, goal commitment, plans to attend graduate school). Only one of the studies that examined this type of dependent variable implemented causal methodology.

From our perspective, independent variables captured the hypothesis explored by quantitative studies. When observing the independent variables explored by the articles, most inquired into the effect of generational status on academic adjustment ($n=37$; 77%). Drawing on Bean and Metzner's (1985) categorization of factors that influence the academic performance of first-generation students, we found articles addressing psychological variables ($n=15$; 31.2%), variables related to social interactions ($n=7$; 14.58%), family-related variables ($n=5$; 10.42%), academic variables ($n=3$; 6.25%) and financial concerns ($n=3$; 6.25%). Based on the findings of Credé and Niehorster (2012) about the relationship between institutional adjustment and persistence, we incorporated a category of institutional variables. We found a total of 15 articles addressing the influence of institutional variables and interventions (31.2%).

From these 48 studies, a total of 39 (75%) focused on the United States context. Additionally, we found two studies from Germany, as well as scarce studies in Australia, France, United Kingdom, Belgium, Canada, and South Africa (one in each context). One study (Reed et al., 2019) compared

Table 1. Details of the articles included in the systematic review analysis

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables				
						A	P	L	E	H
1	Adams et al. (2016)*	EEUU	157	Anova, Manova, Regressions	FG status, Perceived stress; Financial strain					
2	Afeli et al. (2018)*	EEUU	580	Anova, Manova, Regressions, Chi-square	FG status					
3	Almeida et al. (2019)*	EEUU	156	logistic regression, hierarchical regressions	Grit; Informational support networks; Perception of social support					
4	Antonelli et al. (2020)*	EEUU	914	Anova, Manova, Regressions	FG status					
5	Aspelmeier et al. (2012)*	EEUU	322	Hierarchical Regressions	FG status; Locus of control; Self esteem.					
6	Bettencourt et al. (2020)*	EEUU	9,270	Regressions	FG status; Parental STEM occupation; Advanced level courses; test scores, self-efficacy; Educational expectations; High school GPA; Institutional selectivity; Persistence within the first institution; Enrollment in remedial coursework.					

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables				
						A	P	L	E	H
7	Bruno et al. (2019)*	EEUU	230	Regressions	FG status; Performance avoidance goals; Feedback received.					
8	Burger and Naude (2019)*	South Africa	224	Manova	FG status					
9	Canning et al. (2019)*	EEUU	818	Multilevel regressions	FG status; Perceived class-competition					
10	Culver et al. (2019)*	EEUU	1,426	OLS Regressions	Academic rigor.					
11	Darnon et al. (2018)*	EEUU	100	Hierarchical Regressions	FG status, Achievement goals					
12	Deutschlander (2019)†	EEUU	617	Randomized controlled trial, Logistic Regressions	Family communication of academic issues					
13	Dika and D'Amico (2016)*	EEUU	1,277	Logistic Regressions	First semester GPA; Perceived math preparedness; type of STEM career; Perceived social and academic fit					
14	Dong (2019)*	EEUU	7,611	Multivariate Regressions	FG status					
15	Eveland (2019)*	EEUU	1,278	Anova, Manova	Academic support; Social support					

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables					
						A	P	L	E	H	
16	Garriott et al. (2015)*	EEUU	414	Structural Equation Modeling	College self-efficacy, Perceived goal progress, outcome expectations, Environmental supports, Perceived importance of college, Motivation, Positive affect						
17	Garriott et al. (2017)*	EEUU	610	Structural Equation Modeling	FG status, Environmental supports, Personal and Self Stigma, Attitudes towards seeking for help						
18	Garriott and Nisle (2018)*	EEUU	688	Structural Equation Modeling	FG status; Coping Resources (institutional supports, family and peer support, reflective coping); Stress						
19	Garza and Fullerton (2018)*	EEUU	560	Logistic Regressions	FG status, Distance from home; Institutional selectivity; Social integration						
20	Grayson (2011)*	Canada	2,029	ANOVA	FG status; Class Experiences; Academic Involvement; Event Involvement; Paid employment working hours; New Friends						

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables				
						A	P	L	E	H
21	Harackiewicz et al. (2016) [†]	EEUU	1,040	Randomized controlled trial, Hierarchical Regressions	FG status; Attitudes about Biology; Biology background; Belonging uncertainty; Competence valuation; Desire to contribute to society; Self-Confidence; Perceived utility value; Motives for attending college; UV intervention; Prior GPA; High School Poverty rate					
22	Herrmann and Varnum (2018) [*]	EEUU	Study 1: 2,116 Study 2: 362 Study 3: 132 Study 4: 249	ANOVA	Social Class Bicultural Identity Integration					
23	Hodge et al. (2018) [*]	Australia	395	Hierarchical Regressions	FG status; Grit					
24	House et al. (2020) [*]	EEUU	1,355	Hierarchical Regressions	FG status					
25	Hunt et al. (2018) [*]	UK	132	Chi-square	FG status					
26	Jury et al. (2015) [*]	France	91	Mediation Regressions	FG status; Selection of institution; Vigilance to Threat					
27	Kilgo et al. (2018) [*]	EEUU	2,257	OLS Regressions	FG status					

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables				
						A	P	L	E	H
28	Marksteiner et al. (2019) [†]	Germany	86	Inferential analysis, ANOVA, MANCOVA	FG status; Sense of social belonging intervention					
29	Padgett et al. (2012) [*]	EEUU	2,609	OLS Regressions	FG status; Good practices (Academic challenge and high expectations, diversity experiences, interactions with peers, high-quality interactions with faculty)					
30	Parnes et al. (2020) [†]	EEUU	396	Cuasi-experiment, Chi-square	FG status, Helpseeking intervention					
31	Phillips et al. (2020) [*]	EEUU	Study 1: 309 Study 2: 1,372	t-tests, ANOVA	FG status					
32	Próspero et al. (2012) [*]	EEUU	315	Multivariate Regressions	FG status; Motivation					
33	Reed et al. (2019) [*]	South Africa and Canada	844	OLS Regressions	FG status; Country					
34	Rodriguez et al. (2018) [*]	EEUU	35	Multivariate Regression	FG status					
35	Roksa et al. (2020) [*]	EEUU	261	Multivariate Regression	Parental validation					
36	Roksa and Kinsley (2019) [*]	EEUU	728	Logistic Regression	FG status; Family support (emotional and financial)					

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables					
						A	P	L	E	H	
37	Simmons et al. (2018)*	EEUU	156	MANOVA	FG status; Financial hardships experienced						
38	Soria and Stebleton (2012)*	EEUU	1,864	Logistic Regression	FG status; Social Capital						
39	Stephens et al. (2012)*	EEUU	Study 1A: 261 Study 1B: 119 Study 2: 1,528 Study 3: 88 Study 4: 147	MANOVA	FG status; Institutional cultural match/mismatch with independent/interdependent norms						
40	Stephens et al. (2014)†	EEUU	168	Randomized controlled trial	FG status; Difference education intervention						
41	Thompson et al. (2014)*	EEUU	176	Correlations	FG status; Psychological distress; Classism experiences; Racism experiences; Perceived social status						
42	Tibbetts et al. (2018)†	EEUU	438	Randomized controlled trial, Mediation analysis	FG status; Values affirmation intervention						
43	Tibbetts et al. (2016)†	EEUU	Study 1: 749 Study 1B: 798 Study 2: 333 Study 3: 286	Logistic Regressions	FG status; Values affirmation intervention						

(Continued)

Table 1. (Continued)

N	First author and year	Country	N	Methods	Independent Variables	Dependent variables				
						A	P	L	E	H
44	Townsend et al. (2019) ^f	EEUU	133	Randomized field study, Differences in Regressions	FG status; Online difference-education intervention; Perceived social fit; Empowerment; Psychological toughness; Psychological thriving; Resilience; Psychological competence					
45	Tucker et al. (2020) [*]	EEUU	904	Chi-Square, ANOVA	FG status; Peer support intervention					
46	Veldman et al. (2019) [*]	Belgium	674	ANOVA, MANOVA, Chi-Square	FG status; Identity compatibility; Social concerns; Academic concerns					
47	Wittner et al. (2019) [*]	Germany	246	Moderation and mediation analysis	FG status; Self-efficacy; Vocational confidence; Social network size; Social network strength					
48	Wright (2019) [*]	EEUU	5,643	Regressions	FG status; Perception of the campus supportive environment					

Source. Self-Elaboration.

Note. Dependent Variables: “A” = Academic achievement, “P” = Persistence, “L” = Learning outcomes, “E” = Academic engagement, integration and adjustment, “H” = Educational goals y expectations. Gray = Article contains one or more dependent variables in this dimension; White = Article does not contain any dependent variable in this dimension.

^{*}=descriptive, ^f=causal analysis.

Table 2. Classification of articles based on dependent and independent variables

Independent variables	Category of Dependent Variable				
	Academic achievement	Persistence	Learning outcomes and skills	Ac. Engagement and integration	Educational and expectations
FG status	50% (24)	12.5% (6)	10.42% (5)	8.33% (4)	10.42% (5)
Institutional	22.92% (11)	8.33% (4)	4.17% (2)	0	4.17% (2)
Psychological	20.83% (10)	4.17% (2)	0	6.25% (3)	4.17% (2)
Social interactional	8.33% (4)	4.17% (2)	2% (1)	0	2% (1)
Family-related	4.17% (2)	4.17% (2)	0	0	4.17% (2)
Academic	2% (1)	2% (1)	2% (1)	0	0
Financial	4.17% (2)	2% (1)	0	2% (1)	0
Total	62.5% (30)	25% (12)	14.58% (7)	14.58% (7)	12.5% (6)

Note. Percentages out of 48 (total of articles focusing on academic adjustment)

the South African with the Canadian context. Notably, none of these articles analyzed the adjustment of FG students in Latin American countries from a quantitative perspective. All studies examined the experience of students in 4-year institutions (college or universities), except for one studying the transition in 2-year institutions. Three studies included both types of institutions.

In the next sections, we describe the main results from the 48 quantitative studies exploring the adjustment of FG students to the new academic environment, as well as the role intervening variables play in the process. By describing the main dependent variables used to measure the academic performance during the adjustment phase we attempted to answer RQ1. By describing the main results from studies examining each dependent variable we have attempted to answer RQ2. By describing the explanatory variables included in those studies we attempted to answer RQ3. Table 1 provides an overview of the articles.

6. Results

In the following paragraphs, we describe the main findings from the five groups of studies as defined by the dependent variable. The findings regarding the explanatory variables most frequently examined in the studies are presented within each group; they often capture closely the studies' hypothesis. See Table 2. We have focused on the dependent and independent variables, as well as on the studies' methods, because they allow us to understand, group and compare the studies' main findings and present them within the space limitations, despite the importance of additional components of the studies such as theoretical framework and context.

6.1. Academic achievement (n = 30)

Most studies ($n = 9$; Burger & Naude, 2019; Grayson, 2011; Harackiewicz et al., 2016; Phillips et al., 2020; Stephens et al., 2012, 2014; Tibbetts et al., 2016; Townsend et al., 2019; Veldman et al., 2019) found FG students achieved significantly lower levels of academic achievement than CG students, as measured through grade point averages, course end-of-semester grades, results in an arithmetic task, and self-reported grades. However, some did not find statistical differences between the academic achievement of FG ($n = 8$; Afeli et al., 2018; Aspelmeier et al., 2012; House et al., 2020; Marksteiner et al., 2019; Reed et al., 2019; Roksa & Kinsley, 2019; Simmons et al., 2018) and CG students, or even found FG students had better performance (Hunt et al., 2018). In these cases, some authors attributed the smaller than expected variability in academic results to their sample selection (i.e. students already seeking institutional support in House et al.,

(2020); students in their final year of study in Hunt et al. (2018)); students in the context of non-US countries in (Reed et al., 2019), or the use of self-reported academic measures (Afeli et al., 2018).

Regarding the association with institutional factors ($n=4$), there was clear evidence pointing to a negative association between higher perceived classroom competition (Canning et al., 2019), and institutional selectivity (i.e. institutional practice of selecting the best students) (Jury et al., 2015) - and the academic achievement of FG students. However, evidence was mixed regarding other factors, like cultural match/mismatch and fit within the institution. Stephens et al. (2012) showed that emphasizing the value of independence at the university level led to a poorer performance of FG students. In contrast, emphasizing the value of interdependence (i.e., being part of a community) reduced this sense of difficulty and eliminated the performance gap without adverse consequences for CG students (2012). However, Tibbetts et al. (2018) found that even though FG students may have perceived a more inclusive and welcoming culture at the 2-year colleges compared to a typical 4-year institution, the achievement gap persisted.

All studies ($n=7$) focusing on **institutional interventions (causal studies)** exhibited positive effects over FG students' academic achievement, reducing or even closing the gap between FG and CG students. These interventions pointed to diverse dimensions of their experience, such as social belonging (Marksteiner et al., 2019), peer academic support (Tucker et al., 2020), help-seeking behavior (Parnes et al., 2020), the cultural match with the institutional values (Tibbetts et al., 2016), and the value of students' different backgrounds (Stephens et al., 2014; Townsend et al., 2019). Likewise, Harackiewicz et al. (2016) found that an intervention that taught students to see the value of course content and write about it was successful in reducing the achievement gap for underrepresented minorities FG students by 61%. Such effects were documented during the first year and even 3 years after the intervention (in the case of Tibbetts's et al. (2016) randomized and controlled laboratory experiment).

Regarding **psychological factors**, most studies ($n=8$) found a strong association with the academic achievement of FG students. Factors that positively influenced it included the grit factor "effort"¹ (Hodge et al., 2018), mastery-approach goal orientation (Darnon et al., 2018), having integrated social-class identities (Herrmann & Varnum, 2018), and psychological empowerment (Townsend et al., 2019). Conversely, other psychological variables showed a negative association, such as performance-avoidance goal orientation (Bruno et al., 2019), having a low identity compatibility (Veldman et al., 2019), extrinsic motivation and amotivation (Próspero et al., 2012), a high external locus of control and a lower self-esteem (Aspelmeier et al., 2012). All these factors were associated to the lower academic achievement of FG students, compared to their peers. Only two studies, did not find a significant association between psychological factors—i.e. grit and vigilance to threat—and the academic achievement of FG students (Almeida et al., 2019; Jury et al., 2015).

Regarding **social-interactive factors**, Almeida et al. (2019) and Grayson (2011) found that the smaller size of FG students' informational support network of faculty and staff, and a lower involvement in campus activities, were negatively associated with their academic achievement. Contrarily, authors like Eveland (2019) and Townsend et al. (2019) noted no significant associations between perceived support or social engagement variables over the academic achievement of FG students.

Regarding **family-related factors**, two studies found important association with academic achievement. Roksa et al. (2020) showed that, within a sample of FG and low-income students, those who reported being more validated by their parents had a higher academic achievement in their first year. Roksa and Kinsley (2019) portrayed family emotional support as an important predictor of the academic achievement, including grades and credit accumulation, of low-income FG students.

Regarding **academic variables**, FG students perceived less teaching effectiveness of instructors than CGS during the first 3 years of college, which related to their lower grades (Grayson, 2011).

6.2. Persistence variables ($n = 12$)

Regarding measures of one-term persistence, one-year persistence, persistence in the first year, intention to persist and intention to drop out, most studies ($n = 6$) showed a negative association between FG status and persistence-related dependent variables; these students exhibited lower persistence as compared to their CG counterparts (Canning et al., 2019; Deutschlander, 2019; Garza & Fullerton, 2018; Roksa & Kinsley, 2019; Soria & Stebleton, 2012; Tucker et al., 2020).

Several **institutional factors ($n = 4$)**, such as attending courses with a course-assistant (Tucker et al., 2020), and institutional initiatives promoting parent-student communication (Deutschlander, 2019) helped to increase persistence of FG students. Contrarily, Canning et al. (2019) showed that perceived classroom competition, through increasing daily impostor feelings, predicted higher dropout intentions for FG students than for their CG peers. Marksteiner et al. (2019) did not find significant changes in the intention to persist of FG and CG students who participated in an intervention that exposed belonging concerns as a normal situation among freshmen students. These last three studies used causal methodology.

In terms of **psychological variables**, there appeared to be mixed evidence. Self-efficacy played an important mediating factor between performance accomplishments and physiological/emotional arousal, and the persistence intentions for FG students in engineering majors (Garriott et al., 2017). At the same time, Wittner et al. (2019) found no significant relationship between academic self-efficacy beliefs and intention to drop out in either group—FG and CG students.² Their findings indicated academic self-efficacy beliefs have an indirect effect that is completely mediated by confidence in vocational choice for all students.

In addition, regarding **social-interactional factors**, Wittner et al. (2019) were able to show a buffering effect of perceived support network quality moderating the relationship between confidence in vocational choice and intention to drop out, solely important for FG students. In other words, if they were unsure about their vocational choice, high-quality network support reduced their intention to drop out. Particularly, Dika and D'Amico (2016) found that the factors influencing the persistence of FG students varied importantly across major subgroups, with perceived social fit being a positive predictor for persistence in both STEM and non-STEM majors. Although not significant in predicting retention, their descriptive statistics support the notion that STEM students demonstrated high levels of perceived academic fit. This was only a significant predictor of persistence for non-STEM FG students, which is counterintuitive, although it could reflect the studies limitation in measuring academic fit.³

In terms of **family-related variables**, one study found family emotional support is an important predictor of student's persistence, for both FG and CG students, although family financial support has a greater benefit for CG than FG students, compared to the influence of emotional support (Roksa & Kinsley, 2019). In addition, FG and low-income students who reported being more validated by their parents also reported greater persistence intentions (Roksa et al., 2020).

At last, regarding financial variables, Garza and Fullerton (2018) found FG students improved their odds of earning a bachelor's degree if they enroll in post-secondary school located at increased distances from their permanent residence. The authors suggested that increased distance between college and home would minimize obstacles that hinder their ability to achieve the levels of social, academic, and cultural integration in the postsecondary environment that translate into academic success.

6.3. Learning outcomes, intellectual development and learning skills (n = 7)

Regarding measures of learning outcomes, intellectual development and learning skills, evidence was mixed; studies showed both differences and similarities between FG and CG students. Some authors note that FG and CG students significantly differed in terms of learning outcomes and skills. For instance, Padgett et al. (2012) found FG students significantly exhibited less Positive Attitude Toward Literacy compared to students whose parents had at least some higher education. This means that, at the end of the first year of college, FG students reported lower levels of enjoyment of literacy activities and writing. Hunt et al. (2018) found the largest difference in terms of student engagement related to the extent to which students engaged in self-managed learning. Significantly more second-generation students (94%) reported that they undertook self-managed learning than their FG peers (72%).

Conversely, Antonelli et al. (2020) found not only FG students, but students from all groups were lacking the self-regulated learning skills necessary to be successful in college. FG students did not simply score higher or lower than CG students but showed a distinct profile of strengths and weaknesses. They scored above the 50th percentile only on the motivation scale, while CG students scored above the 50th percentile on information processing, the motivation, and the test-taking strategy scales. Time management was the lowest mean percentile score for both FG and CG students—falling below 39% of the nationally normed sample of students for both groups—while the highest mean percentile scores were motivation for FG students and test-taking strategies for CG students. In the same line, Dong (2019) found that, compared with their CG peers, FG students benefited equally from college experiences in terms of overall gains in intellectual development, development of problem solving, development of social and civic engagement, and institutional preparation for graduate school. FG status was related to only one outcome—institutional preparation for career path—for which FG students reported larger gains. The few significant differences found might be explained by a limitation inherent in the sample of graduating seniors, since they have all successfully gone through the adjustment phase. Padgett et al. (2012) found that the level of parental education had no significant relationship with three cognitive outcomes (Need for Cognition,⁴ Collegiate Assessment of Academic Proficiency on Critical Thinking,⁵ and Defining Issues Test-2⁶). On similar terms, Kilgo et al. (2018) found FG students showed higher gains in critical thinking over 4 years of college than their CG peers.

Furthermore, diverse factors were associated with FG and CG students' learning outcomes and skills. Different forms of rigorous teaching practices⁷ influenced the intellectual development of FG and CG (Culver et al., 2019). While assignment rigor benefited continuing-generation students, in-class rigor especially benefitted FG students (2019). As well, the learning outcomes of CG students were associated with the support received for non-academic responsibilities and quality of relationships with administrative personnel, while the learning outcomes of FG students were not (Wright, 2019).

At last, different good practices were associated with the cognitive benefits obtained by FG and CG students (Padgett et al., 2012). FG students derived greater net cognitive benefits from frequent interaction with peers and participation in experiences that were academically challenging than did their CG peers. Contrarily, CG students appeared to derive a greater Need for Cognition from exposure to good teaching and high-quality interactions with faculty than did their FG counterparts. Finally, it appeared that participation in diversity experiences led to significantly stronger positive effects on first-year critical thinking for FG students than for CG students, while having a less positive effect on Need for Cognition for FG students than it did for their counterparts.

6.4. Academic engagement, integration, and adjustment (n = 7)

Most studies (n = 4) using measures related to the degree to which students had integrated into the academic environment of their institutions, or the frequency of feeling engaged during class, found significant differences between FG and CG students. FG students were found to have lower class-engagement,⁸ lower attendance (Canning et al., 2019), lower overall academic integration

(Adams et al., 2016) and report more difficulties adjusting to the curriculum (Afeli et al., 2018) when compared to CG students. Deepening on the intervening factors behind this, authors point to a higher perceived classroom competition and greater daily feelings of being an imposter in class (Canning et al., 2019), as well as a higher perceived stress and financial strain (Adams et al., 2016). As such, these factors could be important intervention targets to address among low-income and/ or FG students to increase their academic adjustment and integration.

Conversely, other studies ($n = 2$) did not find such disadvantages for FG students, showing no differences in their academic⁹ integration (Veldman et al., 2019), nor their academic adjustment (Aspelmeier et al., 2012). Deepening into what may explain this, there were psychological factors that significantly influenced FG students' academic adjustment. Notably, Aspelmeier et al. (2012) showed that, among participants with high Effort Achievement Locus of Control (LOC, i.e. attributing academic achievement outcomes to one's efforts), FG students reported better academic adjustment than did their peers. While the opposite occurred among participants with low Effort Achievement LOC. Regarding external LOC for academic achievement, among participants with low Luck-based Achievement LOC, FG students reported better, though not statistically significant, academic adjustment than their peers; and vice versa. Both patterns of results are consistent with the model of generational status as a factor that increases the original association observed between variables. Likewise, Hodge et al. (2018) also noted the grit factor called "effort" significantly contributed to the academic engagement¹⁰ of FG students, more than it did to their CG peers.

At last, although not an academic engagement scale, Rodríguez et al. (2018) found that despite a higher-than-expected awareness of Latinos and FG students of institutional research activities; this awareness did not translate in engagement in research activities.

6.5. Educational goals and expectations ($n = 6$)

Finally, most scholarly work ($n = 4$) pointed to FG students possessing lower levels of commitment to their educational goals (Burger & Naude, 2019), lower levels of 2-year college relative preparedness¹¹ (Tibbetts et al., 2018), less likelihood to plan to pursue a postgraduate study¹² (Simmons et al., 2018), and significant differences in their perceived academic goal progress¹³ compared to CGS (Garriott & Nisle, 2018).

Moreover, college self-efficacy predicted academic progress, environmental supports predicted college outcome expectations for both FG and CG students (Garriott et al., 2015), institutional supports explained the relation between stress and perceived academic goal progress for FG but not for CG college students (Garriott & Nisle, 2018).

Furthermore, Garriott et al. (2015) and later Garriott and Nisle (2018) found environmental supports (i.e. feeling accepted or liked by members of the institution) were associated with college outcome expectations both for FG and CG students, while institutional supports (i.e. perceiving a helpful assistance from the advisor)—specifically—were associated with perceived academic goal progress for FG but not for CG students.

Only the study of Thompson et al. (2014) did not find differences in job expectations based on generational status.

7. Discussion

The aggregated findings from this review of 39 descriptive and 9 causal quantitative studies published between 2010 and 2020 still show important differences in the academic performance of FG and CG students that should be of concern to higher education institutions. The studies reviewed included multivariate controls and their analyses focused on FG students. Although details such as sample size, measurement instruments psychometric characteristics and statistical methods can affect results, dependent variables for which more differences between FG and CG students were reported included academic performance as measured by academic achievement

(i.e. GPA), persistence and educational goals. These results coincide with pre-2010 findings showing FG students tended to achieve lower grades (Chen & Carroll, 2005; Dennis et al., 2005; Jenkins et al., 2009; Lohfink & Paulsen, 2005; Ramos-Sanchez & Nichols, 2007; Strayhorn, 2006), were less likely to complete their degrees in the expected timeframe, more likely to leave higher education prematurely and without a degree, and less likely to return, than their CG peers (Billson & Terry, 1982; Chen & Carroll, 2005; Engle & Tinto, 2008; Ishitani, 2006; Nunez & Cuccaro-Alamin, 1998; Pascarella et al., 2004; Vargas, 2004; Warburton et al., 2001).

In addition, our review highlights variables that may reduce this gap among students, such as decreasing the perception of classroom competition and the institution's selectivity (Canning et al., 2019; Jury et al., 2015), and increasing the perception of teaching effectiveness for FG students especially in the first year (Grayson, 2011). Furthermore, several institutional interventions exhibited positive associations over FG students' academic achievement and persistence, reducing or even closing the gap between FG and CG students. These have focused not only on academic support (Tucker et al., 2020) but also on non-academic factors, such as promoting sense of belonging (Marksteiner et al., 2019), parent-student communication (Deutschlander, 2019), help-seeking behavior (Parnes et al., 2020), a cultural match with the institutional values (Tibbetts et al., 2016), recognition of the significance of students' different social backgrounds (Stephens et al., 2014; Townsend et al., 2019), and finding value in the course content (Harackiewicz et al., 2016; Tibbetts et al., 2016). These findings add to pre-2010 scarce literature that had explored institutional variables and the effectiveness of institutional support initiatives in facilitating the academic adjustment and performance of FG students (Grant-Vallone et al., 2003; Inkelas et al., 2007; Pike & Kuh, 2005). Further progress could be made in the future if studies of institutional interventions were to implement inferential analysis either through randomized control trials of quasi-experiments.

In line with Bean and Metzner's results (Bean & Metzner, 1985), the findings from our review suggest that enhancing key psychological variables through institutional interventions might be successful in the challenge of reducing the achievement gap. These factors include the grit factor "effort" (Hodge et al., 2018), a mastery-approach goal orientation (Darnon et al., 2018), psychological empowerment (Townsend et al., 2019), the integration of social-class identities (Herrmann & Varnum, 2018), motivation (Próspero et al., 2012), and a higher self-esteem (Aspelmeier et al., 2012). These results are in line with pre-2010 studies showing psychological variables like intrinsic self-motivation, perseverance, and resilience that make FG students more highly likely to succeed in higher education (Hicks & Dennis, 2005; Komada, 2002). The psychological factor of self-efficacy requires further exploration as results on the academic achievement of FG students appear to be mixed (Garriott et al., 2017; Wittner et al., 2019). Previous research (Ramos-Sanchez & Nichols, 2007) found no mediation effect of self-efficacy on the relationship between generational status and academic outcomes, but that, for college students in general, high self-efficacy was related to better performance. According to Wittner et al. (2019), confidence in vocational choice is a relevant mediating factor between academic self-efficacy and intention to drop-out for all students in the German context, which should be further addressed in future research.

In addition, following the study of Deutschlander (2019), developing interventions that promote parental validation and family emotional support (Roksa & Kinsley, 2019; Roksa et al., 2020) may also be a viable and cost-effective way to address the academic achievement and persistence of FG students. This supports the findings from previous scholars who found that social support from parents and peers are important to the academic success of both FG and CG students (Bryan et al., 2009; Gofen, 2007; Swenson et al., 2008).

Given that the post-2010 results regarding the role that financial, social and commuting factors (i.e. support networks, social engagement and involvement in campus activities) play on the academic performance of FG students (Almeida et al., 2019; Eveland, 2019; Garza & Fullerton, 2018; Grayson, 2011; Simmons et al., 2018; Townsend et al., 2019) were mixed or scarce, further research is required. This differs from pre-2010 literature showing the persistence of FG students

was more sensitive to financial aid than their peers' (Somers et al., 2004), and that they were more likely to live off campus (Pike & Kuh, 2005). As well, it had shown that lack of peer support (Dennis et al., 2005) and the lesser involvement (Pascarella et al., 2004) of FG students had negative implications for their academic performance.

Comparing pre-2010 literature and our findings, it is also notable that pre-2010 findings concentrated more on the influence of pre-college experiences, college readiness, academic preparation, previous aspirations, and the social, cultural, and economic backgrounds of FG students. In this systematic review, we found scholarship has shifted its focus towards institutional variables that are part of the college experience.

8. Conclusion

The growth in enrollment of low-income and FG students in higher education observed between 2010 and 2020 has not translated in FG students experiencing the same college academic success as CG students, as measured by grades, persistence, and graduation rates. Although our study is limited to the academic experience of FGS's transition as reported by quantitative studies, we provide findings that could be beneficial for institutional authorities, staff and faculty.

Study reviews confirmed the continued difference in the academic performance and academic adjustment between FG and CG students, especially as measured by grades and persistence. More mixed results are found when examining other variables, such as learning outcomes, intellectual development, learning skills, social integration, and engagement with the academic environment.

More efforts in terms of institutional interventions that support the diverse dimensions of their experience particularly in the social, academic and psychological areas show promising results. Institutions interested in increasing the diversity of their students and ensuring the actual graduation of FG students should pay special attention to them. They include promoting social belonging and peer support as well as the active communication with parents. According to our findings, institutional climate would play a key role as vehicle to promote a cultural match with students' values, boost the significance of students' different backgrounds and reduce the perceived competition and importance of selectivity.

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Author details

María José López^{1,2}
María Verónica Santelices^{1,2}
E-mail: vsanteli@uc.cl
ORCID ID: <http://orcid.org/0000-0003-4062-0047>
Carmen Maura Taveras²

¹ Millennium Nucleus Experience of Students in Higher Education in Chile: Expectations and Realities, Pontificia Universidad Católica de Chile, Santiago, Chile.

² Facultad de Educación, Pontificia Universidad Católica de Chile, Santiago, Chile.

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The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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Notes

1. Grit was measured by two subscales. The first subscale referred to consistency of interest, which captured the individual's ability to maintain interest over time. The second subscale was perseverance of effort (effort), which captured perseverance characteristics (Duckworth et al., 2007).
2. The students' major is not mentioned in the article.
3. The authors (2016) note an important limitation in their measurement of academic and social fit is that they used a single item for each (rated on a 5-point Likert-type scale: "I fit in academically/socially at this institution"). Although not synonymous with engagement, perceived fit may at least be related to the more academically focused engagement indicators from NSSE.
4. Need for cognition refers to an individual's tendency to engage in and enjoy activities that require thinking (e.g., brainstorming puzzles).
5. Critical thinking is defined as the ability to think clearly and rationally, understanding the logical connection between ideas.
6. The DIT measures moral development and character. It is a revised version of the original DIT from 1979 by James Rest. It presents several dilemmas about social problems for the respondent to engage in high order moral reasoning.

7. Culver et al. (2019) defined academic rigor as academic rigor the ways in which instructors ask students to engage with course material, both during class time and in out-of-class assignments.
 8. To assess students' STEM class engagement over the course of semester, students responded to the item: "In [specific STEM class] this semester, how often did you feel engaged during lecture?" Higher scores reflect greater feelings of engagement.
 9. The measure of academic integration consisted of 29 items covering a wide range of areas related to the degree to which students had integrated into the academic university environment ($\alpha = .84$; $M = 5.28$, $SD = 0.62$).
 10. Academic Engagement (a slightly modified version of the Utrecht work engagement scale for schools (UWES-9 (S); Schaufeli 2003) was used to assess student engagement.
 11. Two-Year College Relative Preparedness: was measured with two items ("I feel more academically prepared than other students at this 2-year college" and "I sometimes feel like other students on campus have academic skills that I don't," reverse coded, $\alpha = 0.77$).
 12. Two questions asked students whether they planned to pursue an MSW or planned to pursue another graduate degree. Students could indicate their likelihood ranging from 0=very unlikely to 7=very likely.
 13. Perceived Academic goal progress was assessed with seven items (Lent et al., 2005); Participants were asked to rate their progress toward several academic goals on a Likert scale ranging from 1 (no progress at all) to 5 (excellent progress).
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