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## Review

## Domains and predictors of first-year student success: A systematic review



Petrie J.A.C. van der Zanden<sup>a,b,\*</sup>, Eddie Denessen<sup>b</sup>, Antonius H.N. Cillessen<sup>b</sup>,  
Paulien C. Meijer<sup>a</sup>

<sup>a</sup> *Radboud Teachers Academy, Radboud University, P.O. Box 9103, 6500 HD Nijmegen, The Netherlands*

<sup>b</sup> *Behavioural Science Institute, Radboud University, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands*

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## ABSTRACT

The predictors of first-year student success received much attention in educational practice and theory. However, first-year student success can be defined in various ways. By studying different theoretical research strands, we developed a conceptual framework consisting of three domains of first-year student success, namely students' academic achievement, critical thinking skills, and social-emotional well-being. The goal of this systematic literature review was to illustrate whether the predictors and their effects are similar and/or different across these three domains of first-year student success. A systematic search yielded 80 articles that were eligible. The results indicated that some predictors contributed to multiple domains of success, namely students' previous academic performance, study skills, motivation, social relationships, and participation in first-year programs. Further, some predictors were typical for a specific domain. Academic achievement and social-emotional well-being were particularly related to factors within the student, whereas critical thinking skills were more related to the learning environment.

## 1. Introduction

For a number of decades, the stimulation of first-year student success has been an important theme in higher education and educational policies. Attention to this issue emerged because the number and diversity of students enrolled in higher education institutions have increased over the years and are expected to continue to grow (NCES, 2014; Trow, 2007). In addition, most students who drop out of university do so during or immediately after the first year (Credé & Niehorster, 2012; Willcoxson, Cotter, & Joy, 2011). As earning a degree is linked to cognitive, social, and economic benefits for individuals, their families, and society at large (De Koning, Loyens, Rikers, Smeets, & van der Molen, 2013; Mayhew et al., 2016), it is important to gain a better understanding of first-year student success.

To help first-year students succeed in higher education, many researchers and policymakers have tried to identify effective policies and practices. Their research often focuses on a particular domain of student success, such as academic performance (e.g., Richardson, Abraham, & Bond, 2012; Vanthournout, Gijbels, Coertjens, Donche, & Petegem, 2012) or graduate skills development (e.g., Kember & Leung, 2005; Loes, Salisbury, & Pascarella, 2015). These studies provide us with valuable insights into the predictors of these specific domains. However, it remains unclear whether these types of predictors are similar or different across various operationalizations of success, which might have implications for the strategies to help students to become successful at university. In this systematic literature review, we incorporated three different domains of first-year student success, aiming to illustrate whether a

\* Corresponding author. Radboud Teachers Academy, P.O. Box 9103, 6500 HD Nijmegen, The Netherlands.

E-mail address: [p.vanderzanden@docentenacademie.ru.nl](mailto:p.vanderzanden@docentenacademie.ru.nl) (P.J.A.C. van der Zanden).

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wide spectrum of predictors and their effects are similar and/or different across multiple domains of student success. This review study is not intended to be exhaustive, but rather intended to gain insight into the types of predictors that are important for different domains of first-year student success.

### 1.1. Domains of first-year student success

There has been an ongoing debate about the purpose of higher education, its desired outcomes, and how such outcomes should be measured (Keup, 2006; Schreiner, 2013). As a result, a clear and consistent definition of what it means to be successful at university is lacking. By studying different theoretical research strands, we came up with a conceptual framework consisting of three domains of first-year student success, namely students' academic achievement, critical thinking skills, and social-emotional well-being.

#### 1.1.1. Academic achievement

In current policy discourses and research on the effects of higher education, it is common to equate first-year student success with academic achievement (Nicholson, Putwain, Connors, & Hornby-Atkinson, 2011; Zajda & Rust, 2016). According to this view, students' academic achievement is an indicator of the quality and efficiency of an educational program, on which funding for higher education institutions is also often based. For students themselves, academic achievement is also important because they have, for example, to obtain a predefined number of credit points or grade-point average (GPA) in the first year to continue their studies (De Koning et al., 2013; Moss & Yeaton, 2015). This underlines the need to take students' academic achievement into account in the definition of first-year student success.

Traditionally, most studies define academic achievement in terms of GPA (Robbins et al., 2004). Several meta-analyses of the predictors of students' GPA are already available. Some of these studies specifically focused on students' pre-university achievement as a predictor of university GPA (e.g., Westrick, Le, Robbins, Radunzel, & Schmidt, 2015), while others were more broadly oriented. For example, Richardson et al. (2012) analyzed 1105 correlations and found that students with better pre-university academic performances, who believe in their ability to perform, who set higher academic goals for themselves, who regulate their effort to achieve these goals, and who are well able to flexibly use different learning strategies, obtain higher GPAs at university (all rho's > 0.30). In addition, Robbins et al. (2004) reviewed 109 studies on the effects of psychosocial and study skill variables on students' GPA. They also found that previous academic performances, perceptions of their ability to perform, and motivation to strive for success influence students' GPA (rho's > 0.30). In interpreting these results, we should bear in mind that these studies focused on undergraduate students in general, rather than concentrating on first-year students who have just made the transition to university.

#### 1.1.2. Critical thinking

Although policymakers and researchers of institutional effectiveness often rely on quantifiable outcomes such as students' GPA and obtained credit points, these outcomes provide little insight into students' development of graduate skills during their time at university. The advancement of these skills is one of the key objectives in many higher education institutions around the world (Beasley & Cao, 2014; Stassen, Herrington, & Henderson, 2011). One important graduate skill is *critical thinking*, which can be defined as reasoned and reflective thinking focused on deciding what to believe or do (Ennis, 1993). It typically includes abilities such as analyzing arguments, claims, or evidence; making inferences using inductive or deductive reasoning; judging or evaluating; and making decisions or solving problems (Lai, 2011). Other terms, such as "higher-order thinking" and "scientific reasoning," are also used to refer to these abilities (Ennis, 1993; Lai, 2011). Taking the development of graduate skills into account, first-year student success can, thus, also be defined as the improvement of critical thinking skills.

In a recent meta-analysis, Huber and Kuncel (2016) investigated whether university influenced students' willingness and ability to think critically. Supporting previous studies (e.g., Mayhew et al., 2016), they concluded that students gain 0.59 SDs in critical thinking at university. Abrami et al. (2015) provided deeper insight into teaching practices that foster students' critical thinking. Based on 684 articles covering different educational levels, they found that providing students with the opportunity for dialogue, exposing students to authentic problems, and providing mentoring to students contributed to students' critical thinking skills at all grade levels. How individual student-related variables (e.g., cognitive and motivational variables) influence students' critical thinking skills remained unclear from these studies.

#### 1.1.3. Social-emotional well-being

Student success can not only be defined in terms of whether students perform well at university. The switch from high school to university can also be seen as a transition that may take place more or less successfully. Students leave their familiar high school and are faced with the academic and social demands of university life (Gale & Parker, 2014). In addition, they are in the phase of emerging adulthood that is characterized by identity exploration, increased responsibility, and independent decision-making (Arnett, 2000). Students should be able to cope with and manage these intra- and interpersonal challenges, in order to successfully adapt to the university environment and to achieve a level of social-emotional well-being (Dyson & Renk, 2006; Evans, Forney, Guido, Patton, & Renn, 2010; Keyes, 2002). By incorporating first-year students' psychosocial development into the concept of student success, adaptation to the university environment and achieving social-emotional well-being also form an important domain.

Literature on life transitions aims to describe why some first-year students are well able to negotiate the transition, while others experience problems. According to Nicholson's (1990) transition cycle, preparation is the key to how people first experience and later come to terms with a transition. This preparation entails becoming ready for the change by acquiring helpful expectations, motives, knowledge, and skills (Nicholson, 1990). In addition, Credé and Niehorster (2012) performed a review study to investigate the

correlates of students' adjustment to university. They found that students who are organized and self-confident, who do not experience strong negative emotions, who proactively cope with stressors, and who receive social support are more likely to successfully adjust to the university environment ( $\rho$ 's > 0.30). This is in line with Schlossberg's (1984) theory that students' own strengths and weaknesses, sources of available support, coping strategies, and the characteristics of the transition itself affect how individuals move through a transition.

## 1.2. Present study

From the above-mentioned literature, it is clear that first-year student success is a complex and multidimensional concept. Although students' academic achievement is especially valued in current policy discourses and research on the effects of higher education, this outcome does not give a complete picture of student success (Zepke & Leach, 2010). Based on literature on institutional accountability for student learning, students' graduate skills development, and psychosocial development, we identified three domains of first-year student success: Academic achievement, critical thinking skills, and social-emotional well-being.

To help first-year students succeed in higher education, an understanding of the variables that contribute to success in this specific phase of their education is needed. As each domain of first-year student success points to a different measurement, this might have consequences for which variables function as important predictors. Up until now, it has remained unclear how different types of predictors relate to multiple domains of first-year student success. Accordingly, the first two research questions of this systematic literature review are as follows: Which predictors are relevant for success for each of the three domains separately? And to what extent are these effects similar and/or different across these three domains? While some researchers argue, for example, that social-emotional well-being is a measure of student success on its own, others see it as a key determinant of academic achievement (e.g., Credé & Niehorster, 2012; Robbins et al., 2004). Therefore, our third research question is: How do the three domains of success relate to each other? By adopting this multidimensional view on first-year student success, we aimed to provide an overview of the differences and similarities in the types of predictors relevant for various domains of first-year student success. The results of this review study may serve as a basis for further research on first-year student success.

## 2. Method

### 2.1. Literature search

A systematic literature search, for each domain of student success separately, was conducted using the Education Resources Information Center (ERIC) on May 19, 2015. Articles were searched by combining possible variations of the keyword "first-year-student" (i.e., "freshmen," "first-year-student\*") with possible variations of one of the domains of student success. For academic achievement, the key words "grade-point-average" and "credit\*" were used. For critical thinking skills, the key words were "critical thinking," "higher order thinking," and "scientific reasoning." For social-emotional well-being, "well-being," "adjustment," "integration," and "satisfaction" were used to capture students' adjustment to university and whether students perceived and evaluated their own lives in terms of their affective states and psychological and social functioning positively. The search areas were the title, abstract, topic, and identifiers. In total, 721 articles were found and screened. This set of articles was considered to be sufficient for the purpose of our review study, namely to discuss and relate three different lines of research, their variety of predictors, and their effects.

### 2.2. Inclusion criteria

An overview of our literature search and selection—based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2010)—is presented in Fig. 1. Entering the search terms for students' academic achievement, critical thinking skills, and social-emotional well-being resulted in 220, 84, and 417 hits, respectively. To select appropriate studies, a number of inclusion and exclusion criteria were used. Studies were included if (a) they contained a measure of academic achievement, critical thinking, or social-emotional well-being as dependent variable, (b) participants were first-year college or university students (bachelor's degree) drawn from a general population, to reach out to as many different educational systems as possible, (c) the study described quantitative or qualitative research, and (d) the study was published between 2005 and 2015 in an English-language peer-reviewed journal. Articles were excluded if (a) they were tied to a specific context (e.g., the effects of a biology-oriented program for biology students), (b) they were written with a methodological purpose, or (c) they reported quantitative data without statistical analyses.

The screening of articles took place in several phases. First, two coders independently classified the abstracts of the first 50 articles for each domain of first-year student success as relevant or irrelevant. The coders agreed on more than 90% of the abstracts. Articles on which the coders initially did not agree were discussed in depth until the coders agreed upon inclusion or exclusion. Subsequently, the first author screened the remainder of the articles. This resulted in 63 studies being relevant for academic achievement, 25 for critical thinking, and 84 for social-emotional well-being. Full-text articles were retrieved and further inspection by the first author using the same inclusion criteria resulted in 34, 9, and 35 relevant articles for students' academic achievement, critical thinking skills, and social-emotional well-being, respectively. Although the literature search was carried out for the three domains of student success separately, we found two articles within the search of social-emotional well-being that better fitted the academic achievement domain. These articles were, consequently, assigned to the best-fitting domain, resulting in 36 relevant articles for academic

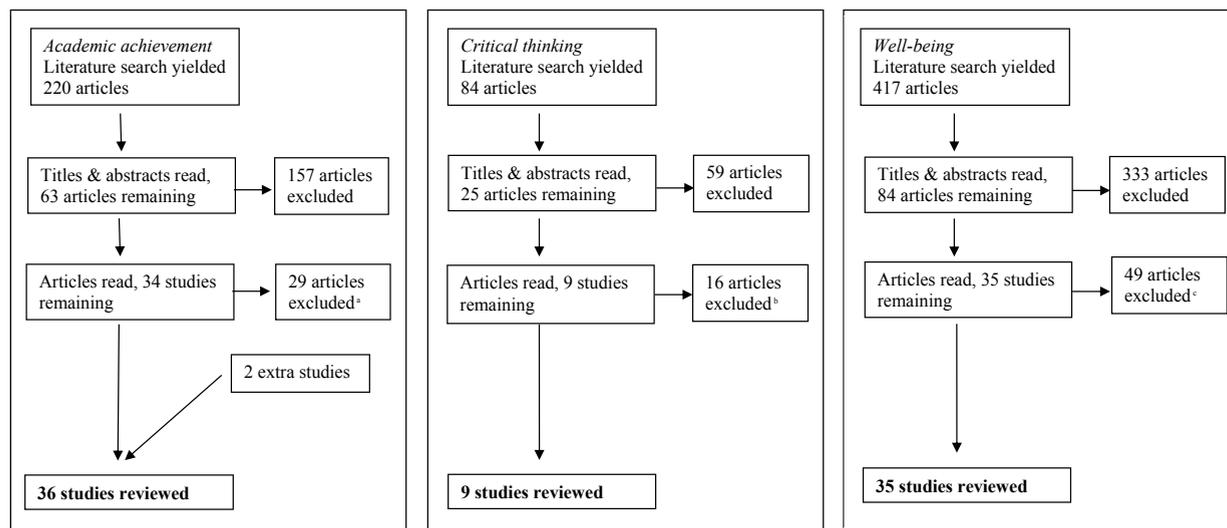


Fig. 1. Search process and results for first-year students' academic achievement, critical thinking skills, and social-emotional well-being.

<sup>a</sup> Inclusion criteria were not met by 26 articles and we did not have access to 3 articles online and authors did not respond to requests.

<sup>b</sup> Inclusion criteria were not met by 14 articles and we did not have access to 2 articles online and authors did not respond to requests.

<sup>c</sup> Inclusion criteria were not met by 43 articles and we did not have access to 6 articles online and authors did not respond to requests.

achievement.

### 2.3. Analysis

To systematically analyze the retrieved studies, an overview was made of the following key characteristics for each study: (1) author, (2) year of publication, (3) research design, (4) country, (5) type of educational institution, (6) sample size, (7) outcome variable, and (8) major findings. To examine the first research question on the predictors of first-year student success, findings from each of the retrieved studies were grouped by predictor for each success domain separately. When effect sizes were reported in the original studies, they were interpreted as small ( $d = 0.20$ ,  $\eta^2 = 0.01$ ,  $r^2 = 0.02$ ,  $\beta = 0.10$ ), medium ( $d = 0.50$ ,  $\eta^2 = 0.06$ ,  $r^2 = 0.13$ ,  $\beta = 0.30$ ), or large ( $d = 0.80$ ,  $\eta^2 = 0.14$ ,  $r^2 = 0.26$ ,  $\beta = 0.50$ ), according to the guidelines of Cohen (1988) and Tabachnick and Fidell (2007). To address the second research question, we analyzed whether the types of predictors and their effects were similar and/or different across the three domains of first-year student success. For the third research question, we analyzed whether success in one domain was predicted by variables from another domain in the selected studies.

## 3. Results

Based on the literature described in the introduction (e.g., Credé & Niehorster, 2012; Robbins et al., 2004), we identified seven broad categories for ordering the predictors of first-year student success: Demographics; academic preparation; academic motivation and study skills; self-evaluations and affect; social support; social integration; institutional and organizational variables; and out-of-class stressors. In the following paragraphs, we use these categories to structure our results section. A category is mentioned when the literature search yielded relevant studies within it. If that was not the case, the category is not mentioned.

### 3.1. Predictors of first-year students' academic achievement

For academic achievement, 36 studies were reviewed. Most of them focused on the predictors of students' first-semester GPA (15 studies) or end-of-first year cumulative GPA (15 studies). Five studies incorporated the number of obtained credit points and one study included both first-year cumulative GPA and credit points. Table 1 displays the key characteristics of the articles. The most salient ones are highlighted here.

Starting with *demographic variables*, the majority of the studies, all conducted in the US, reported small effect sizes indicating that white students were more likely to achieve academically in the first year than students of colour (Bowman, 2014; Gibbison, Henry, & Perkins-Brown, 2011; Kot, 2014; Reynolds & Weigand, 2010; Robbins et al., 2009; Shaw, Mattern, & Patterson, 2011; Shaw, Marini, & Mattern, 2012; Soria, Fransen, & Nackerud, 2013). In addition, it was found that parental income was not related to students' academic achievement (De Wit, Heerwegh, & Verhoeven, 2012; Jamelske, 2009; Pike, Hansen, & Lin, 2011). Mixed results were found for parental education level: Five studies reported small effect sizes indicating that students with more highly educated parents performed better in the first year at university (Bowman, 2014; De Wit et al., 2012; Nunez, 2009; Shaw et al., 2012; Yazedjian, Toews, & Navarro, 2009), while three studies found no relationship (Dika, 2012; Friedman & Mandel, 2011; Zhou et al., 2015). As

**Table 1**  
Predictors of first-year academic achievement.

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Arco-Tirado et al. (2011)	Experimental	Spain	A public research university	$n_{\text{control}} = 50$ $n_{\text{experimental}} = 50$	Cumulative GPA	None: Peer tutoring program
Arnold and Rowaan (2014)	Survey	NL	A public research university	656	Cumulative credits	None: Gender, study expectations, extrinsic motivation, students interested in studying in Rotterdam at Erasmus University, extracurricular activities <i>Significant, no effect size reported:</i> HSGPA, high school math, high school track, intrinsic motivation
Bowman (2014)	Longitudinal survey	US	46 private and public liberal arts colleges and universities	8475	Cumulative GPA	None: Institutional type, non-traditional age, degree aspirations <i>Significant, no effect size reported:</i> Gender, ethnicity, parental education, international student, HSGPA, standardized test scores, institutional selectivity, openness to diversity
Clark and Cundiff (2011)	Quasi-experimental	US	A public research university	$n_{\text{control}} = 326$ $n_{\text{experimental}} = 109$	Cumulative GPA	None: The course 'University 101'
De Wit et al. (2012)	Survey	Belgium	A public research university	1529	Cumulative GPA	None: Gender, parents' financial comfort, scholarship, domain of study, engagement in social activities, social contact skills <i>Small:</i> Classical languages in high school, number of hours spending on math during high school, ambivalent attitude toward study choice, maintenance skills, mother's educational level, father's educational level, intrinsic motivation, reading books, basic ICT skills <i>Medium:</i> HSGPA
Dika (2012)	Survey	Puerto Rico	A public undergraduate institution	594	Cumulative GPA	None: Spanish achievement, frequency talked about career plans with faculty, frequency discussed ideas outside class with faculty, frequency worked on activities, quality of academic advising, quality of relationships with administrative personnel/offices <i>Small:</i> English achievement, math achievement, quality of relationships with faculty members, hours per week preparing for class, parental education, frequency of discussed grades/assignments <i>Medium:</i> HSGPA <i>Small:</i> Social acceptance
Fenning and May (2013)	Survey	US	A public research university	100	First semester GPA	<i>Medium:</i> Scholastic competence
Friedman and Mandel (2011)	Survey	US	A state college	487	Cumulative GPA	None: Need for dominance, need for affiliation, gender, minority status, parental education, standardized aptitude test scores <i>Small:</i> Need for achievement, need for autonomy, HSGPA
Gibbison et al. (2011)	University records	US	A public research university	2472	First semester GPA	None: Living arrangements <i>Significant, no effect size reported:</i> Age, gender, ethnicity, SAT score, HSGPA, average high school SAT, hours attempted at academic activities, participation in recreation programs
Huie et al. (2014)	Longitudinal survey	US	A public research university	591	First&second semester GPA	None: Hours spend on paid worked, difference between on- and off campus work
Jamelske (2009)	Survey	US	A public liberal arts university	1997	Cumulative GPA	None: Having chosen your major, low income, age, ethnicity <i>Significant, no effect size reported:</i> Experience course, ACT score, high school rank, previously earned credits, living arrangements, first-generation student, gender
Jansen and Suhre (2010)	Survey	NL	A public research university	245	Cumulative credits	<i>Indirect effects:</i> Preparation in time management and learning skills affects motivation and study behavior and, in turn, obtained credit points <i>Small:</i> Satisfaction about the choice of course <i>Medium:</i> HSGPA, tutorial attendance

(continued on next page)

Table 1 (continued)

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Kot (2014)	University records	US	A public research university	2745	Cumulative GPA	None: Age Significant, no effect size reported: Gender, ethnicity, non-US citizen, SAT verbal score, SAT math score, advanced placement credits, living arrangements, first-term GPA Small: Centralized advising in the first term, HSGPA
Krumrei-Mancuso et al. (2013)	Survey	US	A public research university	579	First semester GPA	None: Stress and time pressure, involvement with college activities, emotional satisfaction with academics, class communication, ethnicity, gender, organization and attention to study Small: Academic self-efficacy Medium: First-semester GPA
Kurland and Siegel (2013)	Survey	US	A public research university	85	First semester GPA	None: HSGPA, gender, attachment avoidance Significant, no effect size reported: Locus of control, attachment anxiety Small: Peer mentoring program
Leidenfrost et al. (2014)	Quasi-experimental	Austria	A public research university	$n_{\text{control}} = 89$ $n_{\text{experimental}} = 328$	Cumulative GPA	Significant, no effect size reported: Supplemental instruction None: Social support from friends
Malm et al. (2012)	University records	Sweden	A public research university	838	Cumulative credits	Significant, no effect size reported: Living arrangements
Niepon et al. (2006)	Survey	US	A public research university	304	First semester GPA	None: Gender, relational collegiality, emphasis on academic engagement, emphasis on social engagement, faculty-student engagement, higher order cognitive thinking, hours per week participating in co-curricular activities, diversity experiences, ethnicity
Nunez (2009)	Survey	US	A public research university	298	Cumulative GPA	Small: Parental education, HSGPA, hours per week spent preparing for class
Ojani (2009)	Survey	Ethiopia	A public university	214	First semester GPA	None: Achievement motivation, academic self-efficacy, university entrance exams scores, aptitude test scores Medium: HSGPA
Pike et al. (2011)	Survey	US	A public research university	2193	First semester GPA	Small: First-generation or low-income status students, motivation, gender, prior academic achievement, participation in a themed learning community (if self-selection is taken into account, this variable is not significant anymore)
Reynolds and Weigand (2010)	Survey	US	A public research university	164	First semester GPA	None: Self-efficacy, extrinsic motivation, intrinsic motivation, amotivation, university environment Small: Social engagement, ethnicity Medium: Academic engagement
Robbins et al. (2009)	Survey	US	A public research university	1534	Cumulative GPA	None: Participation in social activities, living arrangements, enrollment status
Scott et al. (2010)	Quasi-experimental	US	/	$n_{\text{control}} = 2810$ $n_{\text{experimental}} = 1656$	First semester GPA	Significant, no effect size: Ethnicity, gender, assistance with academic coursework and tutoring, academic risk, advising sessions, participation in sports Small: Advanced placement credits
Severiens and Schmidt (2009)	Quasi-experimental	NL	A public research university	305	Cumulative credits	Significant, no effect size reported: Problem-based learning
Shao et al. (2010)	Quasi-experimental	US	A public university	1084	GPA and credits	Small: Exploration program (for first semester GPA) Medium: Exploration program (for first and second semester credits & second semester GPA)

(continued on next page)

Table 1 (continued)

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Shaw et al. (2011)	Survey	US	109 four-year institutions	140919	Cumulative GPA	None: English and another language as best languages Significant, no effect size reported: Gender, ethnicity, HSGPA, SAT score, difference between writing and reading SAT scores, best spoken language was something other than English
Shaw et al. (2012)	University records	US	125 colleges and universities	74501	Cumulative GPA	Significant, no effect size reported: SAT math score, SAT writing score, HSGPA, gender, ethnicity, parental education, grades on advanced placement courses higher than three, advanced placement proportion, advanced placement average
Soria et al. (2013)	University records	US	A public research university	5368	First semester GPA	None: International student, first-generation student, military veteran status
Swenson Goguen et al. (2011)	Longitudinal survey	US	A branch campus of a state university and a liberal arts university	271	First&second semester GPA	Significant, no effect size reported: Gender, ethnicity, ACT, advanced placement credits, freshman seminar, living arrangements, participation in Access to Success program, scholarship, library use None: Number of friends in college, quality of friendship with one's best high school friend, peer attachment, conflict with high school best friend Small: Conflict with one's best new friend in college Medium: Quality of friendship with one's best new college friend (effect for first semester GPA)
Torenbeek et al. (2010)	Survey	NL	A public research university	2201	Cumulative credits	None: Gender
Wang et al. (2012)	Quasi-experimental	US	A private university	$n_{\text{control}} = 20$ $n_{\text{experimental}} = 24$ 238	First semester GPA	Small: HSGPA, attendance, time devoted to studying Significant, no effect size reported: Social-emotional learning seminar
Wang et al. (2013)	Longitudinal Survey	China	A research university	83	First semester GPA	None: Extraversion Small: Conscientiousness
Wurf and Croft-Piggin (2015)	Mixed method	Australia	A public university	83	Cumulative GPA	None: Emotional intelligence Small: ATAR score (reflects Australian high school achievement) Medium: Booster behaviors (= persistence, planning and task management)
Yazedjian et al. (2009)	Survey	US	A public research university	927	First semester GPA	None: Parents as facilitators of independence, parental support, parental expectations
Zhou et al. (2015)	Longitudinal survey	China	A public research university	519	Cumulative GPA	Small: Quality of parental relationship, parental education None: Parental education, time invested in student clubs, college social self-concept, pre-college academic self-concept, pre-college social self-concept, faculty interaction Small: Gender, national college entrance exam score, medical major, academic engagement, homework time-on-task, college academic self-concept

regards being a student neither of whose parents attended university (e.g., first-generation student), Jamelske (2009) and Pike et al. (2011) found that these students performed worse in the first year at university, whereas Soria et al. (2013) found no effect. Contrasting results were also found for age, gender, and being an international student.

Further, in terms of students' *academic preparation*, multiple studies have shown that students with a higher grade point average in high school (HSGPA) were more likely to show better first-year academic achievement (small to medium effect sizes; Arnold & Rowaan, 2014; Bowman, 2014; De Wit et al., 2012; Dika, 2012; Friedman & Mandel, 2011; Gibbison et al., 2011; Jansen & Suhre, 2010; Kot, 2014; Nunez, 2009; Olani, 2009; Shaw et al., 2011; Shaw et al., 2012; Torenbeek, Jansen, & Hofman, 2010; Wurf & Croft-Piggin, 2015). Surprisingly, one study did not find a significant effect (Kurland & Siegel, 2013). In addition, most studies showed that students with better national college entrance exam scores (e.g., ACT and SAT scores) were more likely to achieve academically at university (Bowman, 2014; Gibbison et al., 2011; Jamelske, 2009; Kot, 2014; Shaw et al., 2011; Shaw et al., 2012; Soria et al., 2013; Zhou et al., 2015). Only two studies did not find an effect. One of these was conducted in Ethiopia (Olani, 2009); the other, like most of these studies, in the US (Friedman & Mandel, 2011). Further, students who had already passed university-level courses when they were in high school (e.g., advanced placement) obtained higher GPAs in the first year (Jamelske, 2009; Kot, 2014; Scott, Tolson, & Lee, 2010; Shaw et al., 2012; Soria et al., 2013).

In addition, students' *academic motivation and study skills* also seem to play a role. Arnold and Rowaan (2014) and De Wit et al. (2012) found that students with internal drive or who enjoy studying achieved higher GPAs and more credits in the first year. However, Reynolds and Weigand (2010) did not find such an effect. Moreover, extrinsic motivation and a lack of motivation were not related to academic achievement (Arnold & Rowaan, 2014; Reynolds & Weigand, 2010). Studies that considered other motivation-related measures (e.g., achievement motivation and degree aspirations) showed mixed results. Further, Jansen and Suhre (2010) found that students' satisfaction with their chosen study program contributed directly to their obtained credit points in the first year, as well as indirectly via study motivation and tutorial attendance.

With regard to students' effort, it was found—with small to medium effect sizes—that students who devoted more time to studying and who attended their tutorials more often obtained better GPAs and more credit points in the first year at university (Dika, 2012; Gibbison et al., 2011; Jansen & Suhre, 2010; Nunez, 2009; Reynolds & Weigand, 2010; Torenbeek et al., 2010; Zhou et al., 2015). Students' (non)verbal efforts to engage in class (e.g., asking questions) were not related to their academic achievement (Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013).

Additionally, five studies included academic self-efficacy, but they differed slightly in their definition of the concept. Fenning and May (2013) and Krumrei-Mancuso et al. (2013) focused on students' confidence in their ability to master coursework and to achieve academically. They found that students with higher levels of self-efficacy were more likely to achieve academically (small to medium effects). Zhou et al. (2015) investigated the effects of students' academic self-concept, consisting of both their academic self-efficacy and motivation to achieve. They also found a positive effect, with a small effect size. In contrast, Olani (2009) and Reynolds and Weigand (2010), who incorporated students' self-confidence in their ability to perform specific academic behaviors, such as listening carefully during a lecture on a difficult topic, found no significant effects on academic achievement.

For study skills, a medium effect size was noted, indicating that students who were better able to plan, manage tasks, set goals, and persist were more likely to achieve academically in the first year (Krumrei-Mancuso et al., 2013; Wurf & Croft-Piggin, 2015). In addition, Jansen and Suhre (2010) found that time management and learning skills contributed to students' motivation and study behavior, which, in turn, influenced their obtained credit points.

Focusing on students' *self-evaluations and affect*, Wang, Cullen, Yao, and Li (2013) found—with a small effect—that conscientious students (i.e., self-reported by students) achieved higher first-semester GPAs. Besides this direct effect, they also found that feedback seeking mediated this relationship. Extraversion did not have an effect on academic achievement. Further, Bowman (2014) showed that first-year academic achievement of students who were more open to interacting with others with different beliefs/cultures was better. In line with these findings, Friedman and Mandel (2011) found, with a small effect size, that students who prefer to work alone on assignments performed less well academically. In addition, Kurland and Siegel (2013) found that students with high locus of control and low attachment anxiety performed better academically. Variables not significantly associated with academic achievement were students' need to interact with or direct others (Friedman & Mandel, 2011), social self-concept (Zhou et al., 2015), attachment avoidance (Kurland & Siegel, 2013), and emotional intelligence (Wurf & Croft-Piggin, 2015).

Alongside these individual variables, *social support* is also important for students' first-year academic achievement. Multiple studies found that students with better quality relationships with parents, faculty members, fellow students, and high school best friends had higher GPAs in the first year (small effect sizes; Dika, 2012; Swenson Goguen, Hiester, & Nordstrom, 2011; Yazedjian et al., 2009). In addition, Swenson Goguen et al. (2011) found that students who had conflicts with their best university friend achieved less in the first year (small effect size), while conflicts with their best high school friend did not have a significant effect. The quality of relationships with administrative personnel was not significantly associated with students' academic achievement (Dika, 2012).

As regards students' *involvement in social and extracurricular activities*, most studies reported nonsignificant associations between students' level of involvement in social activities, extracurricular activities, or interactions with faculty members outside class and their first-year academic achievement (De Wit et al., 2012; Dika, 2012; Krumrei-Mancuso et al., 2013; Nunez, 2009; Robbins et al., 2009; Zhou et al., 2015). Only Gibbison et al. (2011) and Robbins et al. (2009) showed that students who participated in on-campus recreational activities (e.g., sports) were more likely to enjoy better academic achievement in the first year.

In addition, several *institutional and organizational variables* are studied. Multiple studies focused on students' participation in advisory sessions, orientation programs, and first-year seminars. Most of these programs and activities were available to all students but participation was voluntary. Kot (2014), Jamelske (2009), Malm, Bryngfors, and Mörner (2012), Shao, Hufnagel, and Karp

(2010), Soria et al. (2013), and Wang, Wilhite, Wyatt, Young, and Bloemker (2012) took this self-selection problem into account and found that, when variables such as students' SAT scores, HSGPA, and gender were controlled for, advisory sessions and first-year seminars had positive effects on students' GPA and credits (small to medium effect sizes). Features that these programs had in common were a focus on (a) stimulating contact between students, (b) promoting teacher-student interaction, (c) enhancing student accountability for their study, (d) strengthening connections with the university, and (e) enhancing the skills needed for academic success. Leidenfrost, Strassnig, Schütz, Carbon, and Schabmann (2014), Robbins et al. (2009), and Severiens and Schmidt (2009) did not take into account the fact that students voluntarily choose to participate in these programs, but they also found positive effects. However, Arco-Tirado, Fernández-Martín, and Fernández-Balboa (2011), Clark and Cundiff (2011), and Pike et al. (2011), who did take this self-selection problem into account, did not find effects from an experience course, a themed learning community, and a peer tutoring program on students' academic achievement. Moreover, no effects were found from the quality of academic advising and the extent to which the institution emphasized social and academic engagement (Dika, 2012; Nunez, 2009).

Finally, with respect to *out-of-class stressors*, Jamelske (2009), Kot (2014), Nicpon et al. (2006), and Soria et al. (2013) found that students who lived on campus achieved better academically in the first year, whereas Robbins et al. (2009) found no effect. None of these studies reported an effect size. In addition, Huie, Winsler, and Kitsantas (2014) did not find an effect from having a part-time job on first-year academic achievement.

In summary, the reviewed studies showed that students' previous academic achievement, effort, academic self-efficacy, study skills, and participation in special first-year programs related most strongly to students' first-year university academic achievement, with small to medium effect sizes. In addition, the quality of social relationships and more personal variables, such as their conscientiousness and work preference, were also associated with their academic achievement, with small effect sizes.

### 3.2. Predictors of first-year students' critical thinking

In this domain, ten relevant papers were found. Six focused on students' critical thinking skills and three on higher-order thinking skills (Table 2). From the critical thinking articles, Loes, Pascarella, and Umbach (2012), Nelson Laird, Seifert, Pascarella, Mayhew, and Blaich (2014), and Shim and Walczak (2012) all derived their data from the Wabash National Study of Liberal Arts Education (WNS). In this study, two two-year and seventeen four-year colleges and universities participated. Although all three studies focused on students who also completed a critical thinking test, the sample sizes of the individual studies differed from each other. This difference might be explained by the fact that Shim and Walczak (2012) excluded all students from two-year institutions, while Loes et al. (2012) and Nelson Laird et al. (2014) excluded students when their data for the dependent and independent variables were incomplete.

Beginning with *demographics*, students' ethnicity and level of parental education did not have an effect on critical thinking skills (Loes et al., 2012; Nelson Laird et al., 2014; Shim & Walczak, 2012). Contrasting results were found for gender. Nelson Laird et al. (2014) found that males had less developed critical thinking skills (small effect size), whereas Loes et al. (2012) and Shim and Walczak (2012) did not find an effect. Bearing in mind that the samples for these studies all came from the WNS, it is surprising that the effects differed.

With regard to students' *academic preparation*, it was found that students with higher pre-university critical thinking scores (large effect sizes; Loes et al., 2012; Nelson Laird et al., 2014; Shim & Walczak, 2012), higher standardized test scores (small to medium effect sizes; Loes et al., 2012; Nelson Laird et al., 2014), and better proficiency in academic language (for South African students; medium effect size; Grosser & Nel, 2013) were more able to think critically in the first year at university. In addition, involvement in high school did not have an effect on critical thinking skills at university (Nelson Laird et al., 2014).

Three studies focused on students' *academic motivation and study skills*. Nelson Laird et al. (2014) found, with a small effect size, that students who were more likely to learn reflectively (e.g., evaluating and changing their own views and understanding) had better critical thinking skills. Other learning activities, such as integrating ideas from various sources, were not related to critical thinking. Further, the amount of time devoted to preparing for class was not associated with critical thinking skills (Loes et al., 2012). Lastly, Shim and Walczak (2012) reported a small effect size, indicating that students with more intrinsic motivation achieved better in terms of critical thinking. Nelson Laird et al. (2014) did not find an effect, but it remained unclear as to how they defined motivation.

For *social support*, Wawrzynski and Beverly (2012) found that first-year students who were involved as peer mentors in their first eight weeks at university gained in higher-order thinking skills. In terms of *institutional and organizational variables*, it was found that inquiry-based learning environments contributed—with large effect sizes—to first-year students' critical thinking skills (Gottesman & Hoskins, 2013; Gupta, Burke, Mehta, & Greenbowe, 2015; Hugerat & Kortam, 2014). In addition, Shim and Walczak (2012) found that students who were asked challenging and thought provoking questions by teachers more often achieved higher scores on critical thinking (medium effect size), whereas students had lower scores critical thinking when the frequency of group work was higher (small effect size). Other instructional and task characteristics (e.g., asking students to apply concepts, to defend a position in a debate, or to give a class presentation) were not related to critical thinking (Sankar & Raju, 2011; Shim & Walczak, 2012). Focusing on *out-of-class stressors*, Nelson Laird et al. (2014) found, with a small effect size, that students who lived on campus had less developed critical thinking skills, whereas Loes et al. (2012) did not find such an effect. Finally, Nelson Laird et al. (2014) also considered the number of hours students worked, but found no effect.

In summary, medium to large effect sizes were found, indicating that students' pre-university critical thinking skills and learning environments in which inquiry-based learning was implemented or teachers ask challenging and thought provoking questions most strongly contributed to students' critical thinking skills. Further, students' previous academic achievement, their learning skills, intrinsic motivation, and the frequency of group work were also related, although with small effect sizes.

**Table 2**  
Predictors of first-year critical thinking.

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Gottesman and Hoskins (2013)	Longitudinal survey	US	A region university	15	CT skills	<i>Large:</i> Teaching approach with CREATE method
Grosser and Nel (2013)	Survey	South Africa	A public university	89	CT skills	<i>Medium:</i> Academic language proficiency
Gupta et al. (2015)	Quasi-experimental	US	/	$n_{\text{control}} = 10$ $n_{\text{experimental}} = 10$	CT skills	<i>Large:</i> Teaching approach with Science Writing Heuristic
Hugerat and Kortam (2014)	Quantitative	Israel	A college	28	HOT skills	<i>Significant, no effect size reported:</i> Teaching science by inquiry
Loes et al. (2012)	Longitudinal survey	US	19 two- and four year colleges and universities	1354	CT skills	<i>None:</i> Institutional type, parental education, gender, ethnicity, living arrangements, liberal arts emphasis of coursework, time spent preparing for class, classroom diversity, interactional diversity <i>Small:</i> Structural diversity of the institution attended <i>Medium:</i> Precollege academic preparation
Nelson Laird et al. (2014)	Longitudinal survey	US	19 two- and four year colleges and universities	1451	CT skills	<i>Large:</i> Precollege critical thinking <i>None:</i> Higher order learning, integrative learning, ethnicity, parental education, high school involvement, pre-college academic motivation, institutional type, hours of on- and off-campus work, liberal arts emphasis of coursework <i>Small:</i> Reflective learning, gender, pre-college academic preparation, living arrangements
Sankar and Raju (2011)	Longitudinal Survey	US	A public and a private university	86	HOT skills	<i>Large:</i> Pre-college critical thinking <i>None:</i> Working on case studies
Shim and Walczak (2012)	Longitudinal survey	US	17 four-year colleges and universities	1181	CT skills	<i>None:</i> Gender, ethnicity, mother's educational level, father's educational level, parental income, institutional type, class size, instructional practices (e.g., asking students to apply concepts, to defend point of view, to interpret abstract concepts, and to give a well-organized presentation), course-related tasks (e.g., writing, problem solving, and class presentation), task characteristics (e.g., compare and contrast, defend point of view, and integrate ideas) <i>Small:</i> Academic motivation, institutional type, group work <i>Medium:</i> Type of questions asked by the teacher <i>Large:</i> Pre-college critical thinking
Wawrzynski and Beverly (2012)	Survey	US	Colleges and universities	69	HOT skills	<i>Large:</i> Being a peer mentor in the first eight weeks at university

**Table 3**  
Predictors of first-year social-emotional well-being.

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Ames et al. (2014)	Longitudinal survey	Canada	Six public universities	2823	Social adjustment, institutional adjustment	None: Socioeconomic background average vs above average, distal vs urban students. Significant, no effect size reported: HSGPA, gender, socioeconomic background below average vs average, proximal rural vs urban students
Bowman (2010)	Longitudinal survey	US	Nineteen diverse institutions	3081	Personal adjustment Psychological well-being	None: Socioeconomic background average vs above average, distal vs urban students, proximal rural vs urban students Significant, no effect size reported: HSGPA, gender, socioeconomic background below average vs average None: Time spent in co-curricular activities, time spent relaxing and socializing, negative experiences with diversity, athlete status, high school student body similar to own race, ethnicity, parental income, on and off campus work, taking diversity courses Significant, no effect size reported: Institutional type, degree aspirations, quality of relations with other students, being a full time student, first-generation student, gender, age, HSGPA, living arrangements, being a fraternity or sorority member, alcohol consumption, faculty interactions, in-class challenge, experiences with diversity Significant, no effect size reported: Curvilinear effect of interracial interactions with peers, curvilinear effect of overall diversity interactions with peers Small: Friendship quality, gender, quantity of friendships, age Medium: Depression Relationships found for: The Network Teach program None: Proximity seeking Small to large: Insecure attachment
Bowman (2013)	Longitudinal survey	US	Forty-nine institutions	8615	Psychological well-being	None: Peer mentoring program None: Peer mentoring program None: Practicing psychosocial skills with the homework, receiving didactic instruction Medium to large: Attendance of a psychosocial wellness seminar, practicing psychosocial skills beyond the intervention sessions Significant, no effect size reported: Gender, freshmen experience halls
Buote et al. (2007)	Survey	Canada	Six universities	702	Adaptation	None: Gender, age, preventive coping Small: Stressors, proactive coping
Callcott et al. (2014) Carr et al. (2013)	Mixed-method Survey	Australia UK	A public university Three universities	102 131	Social integration Loneliness, depressive symptoms, social integration	None: Good teaching (for African American (AA) students) Significant, no effect size reported: Good teaching (for white students), academic challenge
Collings et al. (2014)	Longitudinal survey	UK	Two universities	109	Perceived stress	
Conley et al. (2013)	Quasi-experimental	US	A private university	$n_{\text{control}} = 22$ $n_{\text{experimental}} = 29$	Adaptation Well-being, perceived stress, adaptation, psychological distress Social adjustment	
Enochs and Roland (2006) Gan et al. (2010)	Quasi-experimental Survey	US China	A research university Two universities	$n_{\text{control}} = 252$ $n_{\text{experimental}} = 259$ 403	Maladjustment	
Goodman (2014)	Longitudinal Survey	US	Forty-eight institutions	$n(\text{white}) = 5864$ $n(\text{AA}) = 764$	Psychological well-being	

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Table 3 (continued)

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Hiester et al. (2009)	Longitudinal survey	US	A private liberal arts college and a branch campus of a public university	271	Adaptation	None: School type, degree of mutual trust in the student-parent relationship, quality of communication between student and parent relationship (men) Medium: Level of anger and alienation in the student-parent relationship (men) Large: Level of anger and alienation in the student-parent relationship (women) None: School type, quality of communication between student and parent Medium: Degree of mutual trust in the student-parent relationship (for men) Large: Level of anger and alienation in the student-parent relationship (effect only sig. for women) None: Family cohesion, family encourages expression of feelings, attention to one's feelings, open conflict in family Significant, no effect size reported: Mood repair, clarity about one's feelings None: Family cohesion, family encourages expression of feelings, attention to one's feelings Significant, no effect size reported: Mood repair, clarity about one's feelings, open conflict in family None: Involvement in social media, minutes spent per week in on-campus involvement, ethnicity, scholarship, parental education Small: HSGPA, ACT score, membership in on-campus groups, organizations and clubs, gender Small: Academic mentoring program
Johnson et al. (2010)	Survey	US	A public university	320	Social adjustment  Personal adjustment	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention  None: Optimism, anxiety Medium: Self-efficacy, depression None: Parental attachment security Small: Social anxiety, ethnicity None: Informational support Significant, no effect size reported: Emotional support, practical support, social support
Kord and Wolf-Wendel (2009)	Survey	US	A public university	354	Social integration	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Larose et al. (2011)	Quasi-experimental survey	Canada	Two colleges	$n_{\text{control}} = 157$	Social adjustment, institutional adjustment	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Leontopoulou (2006)	Survey	Greece	Three universities	$n_{\text{experimental}} = 150$ $n_{\text{control}} = 326$	Personal adjustment Psychological well-being	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Lou et al. (2012)	Survey	US	Two universities	340	Loneliness	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Luyckx et al. (2010)	Survey	Belgium	A public university	399	Depression	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Mattanah et al. (2010)	Experimental survey	US	A university	$n_{\text{control}} = 83$ $n_{\text{experimental}} = 88$	Adaptation Perceived social support, loneliness	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Morton et al. (2014)	Survey	Australia	A public university	84	Adaptation	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Parade et al. (2010)	Longitudinal survey	US	A public university	172	Satisfaction with friends	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention
Ramsay et al. (2007)	Survey	Australia	A public research university	280	Adjustment	None: Academic mentoring program None: Studying away from home, socio economic background, academic excellence Small: Active coping, avoidance coping, negative life events, positive life events, gender None: Using Facebook to communicate with friends Small: Facebook usage intensity Medium: Commitment making & identification with commitment both have a negative effect on depressive symptoms, mediated by identity integration None: A peer-led social support group intervention Small: A peer-led social support group intervention

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Table 3 (continued)

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Ranney and Troop-Gordon (2012)	Longitudinal survey	US	A public research university	242	Positive and negative affect  Depression  Anxiety	<i>None:</i> Face-to-face friendship quality, face-to-face friendship conflict and betrayal, time online with distant friends, distant friend conflict and betrayal, distant friendship quality, gender <i>None:</i> Face-to-face friendship quality, face-to-face friendship conflict and betrayal, time online with distant friends, gender <i>Small:</i> Distant friend conflict and betrayal, distant friendship quality <i>None:</i> Face-to-face friendship quality, face-to-face friendship conflict and betrayal, time online with distant friends, distant friendship quality, gender <i>Small:</i> Distant friend conflict and betrayal <i>None:</i> Frequency of contact with parents, gender <i>Small:</i> Attachment to mother, attachment to father <i>None for men and women:</i> First-generation student, discussions about health with father, parental influence on college decision-making, number of academic support programs attended <i>Small effect for men and women:</i> Ease at developing close friends, sense of belonging, desiring more communication with father <i>Small effect for women only:</i> Ease at academic adjustment, discussions about leisure activities with mother, frequency of interactions with mother, quality of communication with mother <i>Small effect for men only:</i> Hours spend on paid worked, quality of communication with father, <i>None:</i> Perceived parental financial expectations <i>Significant, no effect size reported:</i> Parental social status, parental financial communications <i>Significant, no effect size reported:</i> Parental social status, parental financial communications, parental financial expectations <i>Significant, no effect size reported:</i> Problem-based learning <i>None:</i> Problem-based learning
Sarigianni et al. (2013)	Survey	US	A public university	280	Adaptation	
Sax and Weintraub (2014)	Survey	US	A public research university	847	Emotional well-being	
Senido et al. (2010)	Survey	US	A public university	2098	Psychological distress	
Severiens and Schmidt (2009)	Quasi-experimental survey	NL	Three universities	$n_{\text{problem-based}} = 92$ $n_{\text{mixed}} = 111$ $n_{\text{conventional}} = 123$	Well-being Formal social integration Informal social integration	
Sevinc and Gizir (2014)	Qualitative case study	Turkey	A public research university	25	Adaptation	<i>Relationships found for:</i> Friendships, participation in recreational activities, leisure-time management, institutional belongingness, institutional identity, individual factors such as loneliness and shyness <i>None:</i> Gender, transfer student, ethnicity, mother's educational level, father's educational level, first-year seminar, motive-job, motive-life, motive-fee, HSGPA <i>Small:</i> International student, living arrangements, being a fraternity or sorority member, motive-new, the frequency with which participants used social media <i>Significant, no effect size reported:</i> Friendship quality with high school best friend, the level of conflict in relationship with high school best friend, peer attachment, the level of conflict in relationship with new best college friend, friendship quality with new best college friend <i>None:</i> Friendship quality with new best college friend <i>Significant, no effect size reported:</i> Friendship quality with high school best friend, the level of conflict in relationship with high school best friend, peer attachment, the level of conflict in relationship with new best college friend
Strayhorn (2012)	Survey	US	A public university	755	Sense of belonging	
Swenson et al. (2008)	Longitudinal survey	US	A private and a public college/university	271	Social adjustment, institutional adjustment  Personal adjustment	

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Table 3 (continued)

Authors	Design	Country	Institution	Sample size	Outcome	Findings
Tieu et al. (2010)	Longitudinal survey	Canada	Five universities	474	Adaptation November Adaptation March	None: Hours of participation in out-of-class activities, age, mother's educational level Small: Structure in extracurricular activities, gender, HSGPA None: Gender, age, mother's educational level, structure in extracurricular activities, hours of participation in out-of-class activities Small: HSGPA
Tieu and Pancer (2009)	Survey	US	A public research university	191	Adaptation	None: Number of hours spent on most important activity, total number of hours spent on activities outside schoolwork and paid employment, involvement in activities outside schoolwork and paid employment Small: Quality of involvement in activities outside schoolwork and paid employment
Wardley and Bélanger (2013)	Survey	US	Two universities	601	Adaptation	None: Perceptions of faculty interactions, motivation to study preparation), participation in extracurricular activities Small: Organizational features (services offered in the first weeks/ Medium: Institutional commitment (sense of belonging) Relationships found for: Outdoor orientation program
Wolfe and Kay (2011) Wrench et al. (2013)	Qualitative study Qualitative study	US Australia	A university A public university	14 132	Social integration Well-being	Relationships found for: Geographical relocation, engagement with university learning, belonging to an academic community, time and self-management

### 3.3. Predictors of first-year students' social-emotional well-being

In total, the article search for social-emotional well-being revealed 38 articles. Some studies focused on general measures of well-being (e.g., psychological well-being and loneliness), while others took more situation-specific measures related to the university context into account (e.g., university adjustment and university-related stress). Interestingly, for some variables, different results were found for these different measures. When this was the case, this was stated explicitly. It seems that research into the predictors of social-emotional well-being gives a more diffuse picture (Table 3), although it is an important domain when students make the transition to university.

With regard to *demographic variables*, Bowman (2010) found that first-generation students entered the first year with the same levels of psychological well-being as students whose parents attended university. However, first-generation students experienced less psychological well-being at the end of the first year. In contrast to these results, Sax and Weintraub (2014) found no effect of first-generation status on emotional well-being. As regards students' gender, studies found that female students had more difficulty fitting into the university environment, but experienced higher levels of psychological well-being than men (Ames, Wintre, Pancer, Pratt, & Birnie-Lefcovitch, 2014; Bowman, 2010; Enochs & Roland, 2006; Kord & Wolf-Wendel, 2009; Leontopoulou, 2006). In addition, some studies did not report associations between gender and social-emotional well-being (Gan, Hu, & Zhang, 2010; Ranney & Troop-Gordon, 2012; Strayhorn, 2012). Further, most studies did not find a significant relationship either between students' socioeconomic background and social-emotional wellbeing (Bowman, 2010; Kord & Wolf-Wendel, 2009; Leontopoulou, 2006; Strayhorn, 2012; Tieu et al., 2010) or between ethnicity and well-being (Bowman, 2010; Kord & Wolf-Wendel, 2009; Strayhorn, 2012). In addition, students who studied full-time experienced better well-being than students who studied part-time (Bowman, 2010). Students from a foreign country who studied in the US (i.e., international students) reported lower feelings of belonging in the first year than students from the US (small effect size; Strayhorn, 2012). Finally, contrasting results were found regarding students' age.

In terms of *academic preparation*, Ames et al. (2014), Bowman (2010), Kord and Wolf-Wendel (2009), and Tieu et al. (2010) found, with small effect sizes, that students with better HSGPA and ACT scores experienced both more general and university-specific well-being in the first year. In addition, in respect of students' *academic motivation and study skills*, Wrench, Garrett, and King (2013) found that students with better time and self-management skills experienced better well-being in the first year at university. As for students' motivation, Bowman (2010) found that students with higher degree aspirations entered university with higher levels of psychological well-being, but tended to make lower gains in psychological well-being during the first year. Further, Strayhorn (2012) showed that students who studied because they were eager to discover new things had a higher sense of belonging (small effect size). Other motivation-related variables (e.g., motivation to study in order to get a prestigious job) were not related to students' well-being (Strayhorn, 2012; Wardley & Bélanger, 2013).

Additionally, several studies focused on students' *self-evaluations and affect*. Morton, Mergler, and Boman (2014) found, with a medium effect size, that the belief that one is able to effectively manage difficult situations (coping self-efficacy) was related to students' first-year adjustment to university. Correspondingly, Gan et al. (2010) and Leontopoulou (2006) showed that various coping mechanisms (e.g., seeking social support) contributed to better well-being (small effect sizes). Only preventive coping, focused on reducing the likelihood of future stressors, was not related to students' adjustment (Gan et al., 2010). In regard to students' affect, small to medium effect sizes were found, indicating that students who felt more depressed, lonely, and socially anxious were less well (socially) adjusted in the first year (Buote et al., 2007; Morton et al., 2014; Parade, Leerkes, & Blankson, 2010; Sevinc & Gizir, 2014). In addition, the extent to which students were able to identify and handle their emotions was related to higher levels of adjustment (Johnson, Gans, Kerr, & LaValle, 2010). General anxiety was not related to students' well-being (Morton et al., 2014). Furthermore, Carr, Colthurst, Coyle, and Elliott (2013) found that students with more insecure attachment styles experienced less well-being (small to large effect sizes). Finally, Luyckx, Schwartz, Soenens, Vansteenkiste, and Goossens (2010) found that identity development traits, such as commitment making and identification with commitment, related to enhanced levels of well-being in the first year.

Moving to the *social support* students receive, multiple studies showed, with small effect sizes, that (good-quality) friendships positively contributed to first-year students' well-being (Bowman, 2010; Buote et al., 2007; Sax & Weintraub, 2014; Sevinc & Gizir, 2014; Swenson, Nordstrom, & Hiester, 2008). In addition, Ranney and Troop-Gordon (2012) found that computer-mediated communication with a distant friend contributed to better well-being among students whose face-to-face friendships were low in quality or high in conflict. In line with these findings, several studies found that a sense of belonging positively contributed to students' well-being (Sax & Weintraub, 2014; Sevinc & Gizir, 2014; Wardley & Bélanger, 2013; Wrench et al., 2013), with small to medium effect sizes reported. In regard to the types of support that students received, results showed that social, emotional, and practical support (e.g., receiving material assistance) positively contributed to first-year students' university adjustment (Ramsay, Jones, & Barker, 2007). Receiving informational support and cognitive guidance (e.g., advice and suggestions) did not relate to adjustment levels.

Further, in terms of the parent–student relationship, results showed that first-year students who desired more communication with their father (small effect size; Sax & Weintraub, 2014) and who felt alienated from their parents (medium effect size; Hiester, Nordstrom, & Swenson, 2009) experienced less well-being. In contrast, students who could talk with their parents about financial issues and whose parents expected them to manage their personal finances themselves experienced better well-being (Serido, Shim, Mishra, & Tang, 2010). Further, differential effects were found for men and women. For men, the quality of communication with their father predicted well-being, while for women, the quality of communication with their mother contributed to their well-being (both small effect size; Sax & Weintraub, 2014). In addition, Hiester et al. (2009) noted a medium effect size indicating that higher levels of trust in the student–parent relationship were related to better well-being amongst men. For women, communicating more frequently with their mother was related to lower well-being (Sarigiani, Trumbell, & Camarena, 2013; Sax & Weintraub, 2014), whereas discussing leisure activities with their mother predicted better well-being (Sax & Weintraub, 2014). Johnson et al. (2010) adopted a

broader scope than the parent–student relationship, namely students' families. They found that students with prolonged conflict in their family experienced less well-being after the transition to university. The extent to which family members provided support to each other did not have an effect (Johnson et al., 2010).

As regards students' *involvement in social and extracurricular activities*, it was found that students' use of social media in itself was not related to students' well-being (Kord & Wolf-Wendel, 2009; Lou, Yan, Nickerson, & McMorris, 2012), but the frequency of use was (small effect sizes; Lou et al., 2012; Strayhorn, 2012): Students who used social media more frequently felt more lonely. In regard to students' participation in extracurricular activities, the opposite was found. Instead of the frequency (Bowman, 2010; Kord & Wolf-Wendel, 2009; Tieu & Pancer, 2009; Tieu et al., 2010), it was the involvement in extracurricular activities itself, the quality of this involvement, and the quality of the activities that were related to higher levels of university adjustment (small effect sizes; Kord & Wolf-Wendel, 2009; Sevinc & Gizir, 2014; Tieu & Pancer, 2009; Tieu et al., 2010; Wardley & Bélanger, 2013). Being a fraternity or sorority member yielded contrasting results. It positively influenced students' sense of belonging, but contributed negatively to their psychological well-being (Bowman, 2010; Strayhorn, 2012).

Alongside individual and social variables, *institutional and organizational variables* might play a role. Various studies investigated the effects of special first-year student support initiatives. With small to large effect sizes, they showed that providing accurate recruitment materials, assistance with questions, and psychosocial skills training all contributed to first-year students' adaptation to university and well-being (Conley, Travers, & Bryant, 2013; Wardley & Bélanger, 2013). Furthermore, special housing and activity programs (e.g., living in freshmen experience halls and participation in an outdoor orientation program) also had positive effects on students' well-being (Enochs & Roland, 2006; Wolfe & Kay, 2011). In contrast to these findings, Strayhorn (2012) found that participation in a first-year seminar was not related to students' sense of belonging. However, the nature of the seminar that this study focused on was unclear. In terms of peer mentoring programs, multiple studies showed that participation contributed to students' social integration and adjustment, and not to their more general adjustment feelings (Callcott, Knaus, Warren, & Wenban, 2014; Collings, Swanson, & Watkins, 2014; Larose et al., 2011; Mattanah, Ayers, Brand, & Brooks, 2010).

Finally, with respect to *out-of-class stressors*, Gan et al. (2010) showed that first-year students who experienced more stressors were less able to adjust to the university environment (small effect size). Additionally, students who lived on campus reported a stronger sense of belonging (Strayhorn, 2012), but not more psychological well-being (Bowman, 2010; Leontopoulou, 2006). Further, Bowman (2010) found no effect from paid jobs on well-being, whereas Sax and Weintraub (2014) found an effect for males, indicating that male students who worked more hours experienced less well-being in the first year at university (small effect size).

In summary, students' coping self-efficacy, coping skills, sense of belonging, affect, and participation in special first-year programs—which are focused on providing students with social network opportunities and academic support—most strongly contributed to first-year students' social-emotional well-being (small to large effect sizes). Further, students' previous academic achievement, intrinsic motivation, social relationships, and participation in social and extracurricular activities were important for students' well-being in the first year, with small effect sizes.

### 3.4. Similarities and differences between predictors of the three domains of first-year success

It seems that students' previous academic performances (e.g., HSGPA and SAT/ACT scores), intrinsic motivation, and study and learning skills (e.g., planning and reflective learning) most strongly predicted students' first-year university academic achievement, as well as their critical thinking skills and social-emotional well-being. Moreover, good-quality relationships with parents, their faculty, and fellow students and participating in special first-year programs were related to higher academic achievement and better social-emotional well-being, whereas attachment problems (e.g., attachment anxiety) contributed to lower academic achievement and well-being.

In addition to these predictors with similar effects across the domains, we also found some predictors that were relevant for a particular domain of first-year student success. For academic achievement, students' academic self-efficacy and effort seem important, but they were not significantly related to students' critical thinking skills and/or social-emotional well-being or not studied in this context. Characteristics of the learning environment (e.g., inquiry-based learning and the type of questions asked by teachers) play a large role in critical thinking, whereas research on *institutional and organizational variables* in the domains of academic achievement and social-emotional well-being mostly focused on participation in special first-year support programs. Further, first-year students' social-emotional well-being was strongly related to their coping self-efficacy and skills, affect, and sense of belonging, which were barely studied in the domains of academic achievement and critical thinking. Moreover, participating in extracurricular activities positively predicted students' well-being, but was not consistently associated with their academic achievement. For some predictors, even tensions between outcome variables within one domain were found. For example, being a sorority or fraternity member had a positive effect on first-year students' adjustment to university, but not on their psychological well-being (Bowman, 2010; Strayhorn, 2012). Thus, it seems that although some variables promote success in all three domains, others are more specifically related to a particular domain. We have synthesized these findings into a conceptual model, see Fig. 2.

### 3.5. Relations between the three domains of student success

Our literature search yielded some articles in which success in one domain was predicted by another domain. Starting with relationships between students' academic achievement and social-emotional well-being, Fenning and May (2013) and Reynolds and Weigand (2010) found that students who felt socially integrated and accepted at university obtained higher first-year academic achievement. However, Strayhorn (2012) did not find that students' sense of belonging was related to their academic success, and

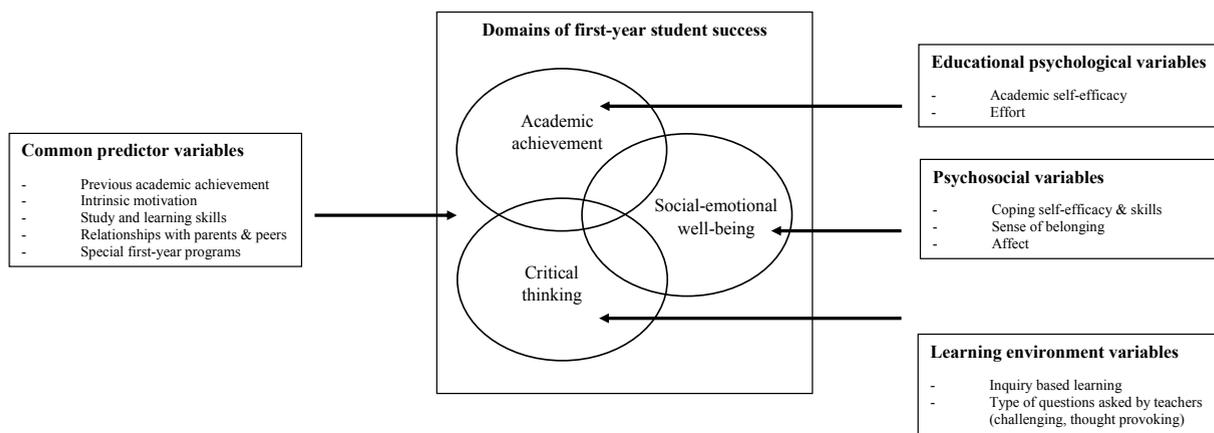


Fig. 2. Domains and predictors of first-year student success: Model of empirical evidence.

neither were their satisfaction with the university environment (Krumrei-Mancuso et al., 2013) and their psychological well-being (Leontopoulou, 2006). Further, some studies focused on the role of students' critical thinking in their well-being and academic achievement. It was found that, in learning environments in which students' ideas were challenged and higher order thinking was stimulated, students experienced better psychological well-being (Bowman, 2010; Goodman, 2014). However, an emphasis on higher-order thinking was not related to students' academic achievement (Nunez, 2009).

Alongside these studies, Nicpon et al. (2006) investigated the effects of supportive peer relationships on two domains of student success, namely students' loneliness and GPA. They found that students who received more social support from peers experienced less loneliness. However, they found no effect for GPA. Further, two studies investigated whether university adjustment mediated the relationship between a predictor and academic achievement. Yazedjian et al. (2009) focused on the role of parents and found that students whose parents attended university felt more adjusted and, in turn, obtained higher GPAs. A similar mediation effect was found for parental support: Students with close relationships with their parents experienced better adjustment and had a higher GPA. These effects were only found for white students and not for Hispanic students. Focusing on the role of the learning environment, Severiens and Schmidt (2009) also found a mediation effect of adjustment, indicating that a problem-based learning environment (i.e., activating and cooperative) contributed to students' social integration and, in turn, to their obtained credit points.

## 4. Discussion

### 4.1. Conclusion

By adopting a multidimensional view on first-year student success, this review study aimed to illustrate whether a wide spectrum of predictors and their effects are similar and/or different across multiple domains of student success. Overall, we found three important conclusions in answer to our research questions. First, several predictors appear to be relevant for more than one of the domains of first-year student success (e.g., previous academic achievement and intrinsic motivation). Second, different types of predictors influence the domains differentially. It seems that students' academic achievement and social-emotional well-being are particularly related to variables within the student (e.g., educational psychological variables and psychosocial variables, respectively), whereas critical thinking skills are more related to the learning environment. Third, it is not the case that the three domains of first-year student success are completely separate from one another. However, success in one domain does not necessarily relate to success in another. In the following paragraphs, we elaborate on these conclusions and highlight some avenues for future research.

Starting with the first two research questions (see also Fig. 2), it was found that some predictors contributed to multiple domains of first-year student success. Students with better prior academic achievement, study and learning skills, intrinsic motivation, and good-quality relationships with parents and peers enjoy better academic achievement, social-emotional well-being, and/or critical thinking skills. Further, participation in special first-year programs, focused on students' social connections and academic skills, also contributed to first-year student success across domains. Additionally, some predictors were typical for a specific domain. Educational psychological variables, such as academic self-efficacy beliefs and effort, predicted first-year students' academic achievement. Psychosocial variables, such as students' coping self-efficacy and affect, particularly influenced their social-emotional well-being. Moreover, specific characteristics of the learning environment, such as engagement in inquiry-based practices, were related to students' critical thinking skills. The predictors that we found to be relevant also emerged from previous review studies and meta-analyses, for example those of Credé and Niehorster (2012) and Richardson et al. (2012). By adopting a multidimensional approach, we have shown whether these predictors are relevant for only one domain or have similar or different effects for the three domains of first-year student success.

With regard to the third research question, it seems that the three domains of success are not completely independent of one another. Fenning and May (2013) and Reynolds and Weigand (2010), for example, found that first-year students who felt socially integrated and accepted at university obtained higher academic achievement. In addition, Yazedjian et al. (2009) found that students'

social-emotional well-being mediated the relationship between parental variables and academic achievement. However, Strayhorn (2012) did not find that feelings of social acceptance related to success in the academic domain, and neither did a high level of psychological well-being (Leontopoulou, 2006). These findings suggest that success in one domain can contribute to success in another, but that this does not apply to all students. While some students might become successful in all three domains, others might experience problems in one or more domains in that they, for example, obtain high academic achievement at the cost of their social-emotional well-being and/or critical thinking skills.

#### 4.2. Limitations and future research directions

There are several avenues of interest left to be explored in future research. First, given that students who are successful in one domain are not necessarily successful in another domain, future research should consider for which first-year students the different domains of success might complement each other and under which circumstances tensions might arise. Second, it would be interesting to explore how the different domains of success influence each other over time. It might be the case, for example, that students' academic achievement and social-emotional well-being improve or exacerbate each other over time.

Third, more research is needed to further investigate the influence of the learning environment on student success. As specific aspects of the learning environment at university contribute to students' critical thinking skills, it seems worth investigating whether these aspects also influence students' academic achievement and social-emotional well-being. By exploring these direct and indirect processes (e.g., by enhancing students' motivation or study skills), insight can be obtained into the opportunity to create a learning environment in which students' academic achievement, social-emotional well-being, and critical thinking skills are simultaneously stimulated.

Fourth, one of the goals of gaining more insight into first-year student success is to enable students to earn a bachelor's degree and to reduce dropout rates. However, up until now, it has remained unclear which students are most likely to drop out during or immediately after the first year. According to Tinto's (1975) model of student retention, students' decision to withdraw from a course is especially based upon their degree of academic and social integration. Given this model, more research is required that takes into account all three domains of first-year student success, in order to determine how combinations of, and interactions between, the three domains relate to student dropout.

Furthermore, all studies in this systematic review involved first-year university or college students. Although in this way students from different educational systems and countries were included, we cannot guarantee that all possible diversity of first-year students is represented in these studies. Future research might gain more insight into the experiences and success of specific populations of first-year students, such as ethnic minority students, international students who completed their high school in a foreign country, or mature-age students. In addition, we examined all predictor variables that were included in the 80 articles we identified. However, it is possible that some variables that are relevant for first-year student success so far have been overlooked in the literature. It will be interesting in future research to think beyond the boundaries of existing research paradigms (e.g., advanced neuroscience, cultural anthropology) to see whether there are other variables that might play a role in first-year student success.

From a methodological point of view, this research field may also benefit from more standardization of the definition of concepts and of measurement instruments. In reviewing the literature, we noticed that social-emotional well-being, in particular, was defined differently across studies. Some studies focused on a general sense of well-being (e.g., I often feel lonely because I have few close friends with whom to share my concerns; Ryff, 1989), whereas others took domain-specific types of well-being into account (e.g., I have been feeling lonely a lot at college lately; Baker & Siryk, 1989). In addition, studies used slightly different instruments for the same concept (e.g., the College Adaptation Questionnaire, Crombag, 1968, and the Student Adaptation to College Questionnaire, Baker & Siryk, 1989) or the same measure with different reference periods (e.g., first-semester GPA and cumulative first-year GPA). In this review, we attend to these different operationalizations by reporting when contrasting results were found. However, for meta-analytic purposes, this variety is more problematic, as it limits the possibility of pooling data across studies.

#### 4.3. Final thoughts

By adopting a multidimensional view on student success, we have illustrated the complexity of becoming successful in the first year at university and the wide variety of predictors that contribute to it. These insights provide a framework for future research and input to the consideration of efforts that might enhance first-year student success. In order to enable students to become successful at university, it is not sufficient to focus on only one domain. We argue that first-year student success is about more than academic achievement, and that it is relevant to pursue other outcomes as well. Only by addressing these three domains in conjunction with one another can first-year student success be enhanced and, in the end, the likelihood of obtaining a bachelor's degree increased.

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