social sciences

MDPI

Review

A Review of First-Year Student Stress and Social Support

Rebecca Maymon * and Nathan C. Hall

Department of Educational and Counselling Psychology, McGill University, Montreal, QC H3A 1Y2, Canada; nathan.c.hall@mcgill.ca

* Correspondence: rebecca.maymon@mcgill.ca

Abstract: The present paper reviews empirical literature on stress and social support relative to first-year post-secondary students, published between 1996 and 2020. Empirical studies included in the literature search focused on stress, coping, and social support specifically among first-year undergraduate students while studying in countries adopting North American higher education models comparable to the United States and Canada. This review examines contextual and psychological antecedents and correlates of stress, as well as associated demographic and achievement variables. Furthermore, this review extends to studies on social support categorized by source (peers, family, faculty, institution, and multiple sources of support). A synthesis and critique of the literature explores the themes in the empirical research presented, as well as considerations for future research.

Keywords: first-year students; literature review; post-secondary; social support; stress; undergraduate

Citation: Maymon, Rebecca, and Nathan C. Hall. 2021. A Review of First-Year Student Stress and Social Support. *Social Sciences* 10: 472. https://doi.org/10.3390/socsci10120472

Academic Editor: Nigel Parton

Received: 22 October 2021
Accepted: 6 December 2021
Published: 8 December 2021

1. Introduction

Mental health in university students in recent years has become a critical issue across Canada and the United States, with alarming suicide rates and evidence of mental illness symptoms developing in college and university students with no previous history (Kennedy 2013; Lunau 2012; Wong 2017). Although some stress can be motivationally beneficial in university settings (LePine et al. 2004), problematic levels of anxiety and depression are often experienced when college students are faced with compounded stressful events without adequate support (Connor-Smith and Compas 2002). First-year students in particular are vulnerable to psychological challenges due to the transition to university exacerbating existing causes of stress (Denovan and Macaskill 2013), with high levels of stress paired with maladaptive coping strategies linked to depression in first-year students (Dyson and Renk 2006). In addition to mental health consequences (Ciarrochi et al. 2005), stress has also been found to affect first-year students' physical health (Wilson et al. 2015; Welle and Graf 2011), retention (Earnest and Dwyer 2010), adjustment (Friedlander et al. 2007), educational experiences (Stoliker and Lafreniere 2015), as well as well-being and academic performance (Pluut et al. 2015).

In an extensive review of factors contributing to first-year student retention, Tinto (2001) identified psychological adjustment difficulties as critical contributing factors to student attrition during the first year of higher education. Empirical research internationally has also identified students' transition experiences as a source of stress during their first year of post-secondary studies (e.g., Australia: Molloy 2016; Canada: MacDonald 2017; United Kingdom: Coughlan 2015), with trends over recent years showing increasing stressors for those entering higher education (e.g., competitively, financially, etc.). In a critique of the stress associated with higher education in the U.S., Cook (2014) portrays college admissions as a "bubble about to burst" (p. 1). Adding to the stress experienced by students transitioning into higher education each year, the number of high school graduates competing for college acceptance is increasing each year (e.g., percentage of Canadians graduates: 85% in 2010 vs. 93% in 2016; OECD 2018). Although college enrolment rates continue to grow (e.g., U.S.: 26% to 41% from 1980 to 2012; FIFCFS 2014), college acceptance

rates have decreased over the past few decades (e.g., Columbia University: 65% to 7% from 1988 to 2014; Cook 2014).

In addition to an increasingly competitive admissions process, increasing costs of post-secondary education (e.g., U.S.: 24% increase from 1999 to 2012; FIFCFS 2014) are another source of stress for first-year students. Students are taking out more loans, and for greater amounts, than they were a few decades ago (e.g., U.S. undergraduate loans: $14,700 in 1990 to $25,400 in 2012; FIFCFS 2014). While an increasingly competitive admissions process and rising costs represent salient contributors to stress for students embarking on their journey through the higher education system, this period offers various additional stressors that make this transition especially challenging (e.g., increased responsibility, financial independence, moving away from loved ones). Stress and negative consequences related to coping and psychological well-being remain a pervasive issue in higher education despite persistent research efforts (Welle and Graf 2011), with stress emerging as a primary factor influencing students' transition to university in qualitative assessments (Wrench et al. 2013).

The success of students' transition to higher education has perhaps been most aptly described as being due to "the capability to navigate change" (Gale and Parker 2014, p. 737), with such capabilities more specifically operationalized by the authors as the resources available to help students adapt to change during this time. Moreover, whereas the transition from secondary to post-secondary education represents a prototypically stressful experience, this transition may be particularly challenging for students identified as high-risk due to specific demographic factors (e.g., racial or sexual minority, first-generation, international, etc.). For example, a survey of almost 14,000 first-year students across eight countries revealed LGBTQ+ identification to be more strongly correlated with suicidal thoughts and behaviours than a number of other demographic (e.g., religion, SES) and college-related (e.g., academic ranking, living situation) variables (Mortier et al. 2018), highlighting the importance of exploring both resources and risk-factors in research with first-year students.

Research on critical resources that help mitigate negative consequences of stress for first-year students has shown social support to reduce stress over a four-month period of transition (Miczo et al. 2006), promote more adaptive coping and healthier behaviour (McKinley 2013), and ease the transition to university life (Pancer et al. 2004). Support from peers, family, and the institution has also consistently been linked to higher GPA as well as better physical and emotional well-being in students (Hartung et al. 2015; Kennedy and Tuckman 2013; Mattanah et al. 2012; Mounts 2004). Furthermore, interventions aiming at enhancing students' perceptions of support by promoting a sense of school belonging have similarly been found to positively influence GPA and persistence (e.g., STEM majors; McGonagle et al. 2014; Walton and Cohen 2011).

As social support represents an essential component of first-year student success (see van der Zanden et al. 2018 for a systematic review), a deeper understanding of how students utilize social support during their transition to higher education is paramount in creating a learning environment that provides adequate resources for first-year students. Such an understanding may be obtained by assessing social support with measures that go beyond ratings of how often students receive support (i.e., support frequency) by further exploring the quality, accessibility, and utility of received support, as well as examining support received from multiple sources. As such, the present paper reviewed existing research literature on first-year student stress and stressors related to personal factors (e.g., ethnicity, gender, first-generation status, etc.) alongside literature on social support for first-year students.

2. Literature Search and Review Methods

Literature on undergraduate student stress, coping, and social support during the first year of attending a higher education institution was reviewed by examining the measurement methods used to assess social support, empirical findings on the precursors to first-year university students' stress, and exploring social support from various sources

in relation to student stress and other well-being outcomes. Specifically, the literature search was guided by two main questions: (1) What is stress and what are the precursors to stress for first-year undergraduate students, and (2) how do first-year students use social support to cope with stress?

2.1. Inclusion and Exclusion Criteria

Empirical studies included in the literature search were those that focused on stress, coping, and social support, specifically among first-year undergraduate students studying in countries that adopt North American higher education models comparable to the United States and Canada (e.g., Australia, Finland, The Netherlands, The United Kingdom). In addition to the literature cited in the introduction that outlines links between stress and a range of physical and mental factors for first-year students, the transition to university has also been explored in the research literature as a particularly stressful period due to developmental changes unique to emerging adulthood (Arnett 2000; Compas et al. 2001; Skinner and Zimmer-Gembeck 2007). As such, the scope of the present review is limited to first-year students in post-secondary institutions and excludes mature students (cf. studies on student stress and social support in upper-level undergraduates; e.g., Krypel and Henderson-King 2010; Largo-Wight et al. 2005; Li et al. 2014; Thompson and Mazer 2009; Vogel and Wei 2005).

Empirical studies reviewed were also restricted to those with measurements of stress that were independent of anxiety and depression. It is important to note that anxiety and depression are constructs closely related to stress in that both are traditionally conceptualized as a reaction to stress, and that each is typically viewed as an indicator of psychological distress resulting from prolonged, or sometimes acute and severe, stressors (Mirowsky and Ross 2017; Wheatley 1997). Nevertheless, to maintain a focus on the construct of stress as an antecedent of first-year student development, studies with a focus on anxiety or depression that did not explicitly examine perceptions of stress as a unique identifiable construct were excluded (studies with a focus on stress but also assessing anxiety and/or depression as separate constructs were retained).

2.2. Search Protocols

The PsycInfo and Education Resources Information Center (ERIC) databases were used for the literature search informing the present critical review. Works published specifically between 1996 and 2020 were included given the aforementioned global shifts in higher education obtainment over the past 25 years (e.g., Cook 2014; FIFCFS 2014; OECD 2018). Selected theoretical and scale development papers published before 1996 were additionally discussed as forming the foundation for subsequent empirical research (Lazarus and Folkman 1984). The literature search included peer-reviewed articles, authored or edited books, and book chapters, as well as article and book reviews published in English. Relevant empirical works from reference lists of articles obtained in the search that met the search criteria were also included (i.e., those with a strong focus on first-year student stress or social support).

Search terms included stress, burnout, well-being, coping, emotion regulation, social support, belonging OR relatedness, and were each combined (Boolean search; AND) with a first-year student parameter. First-year student synonyms included freshmen, first-year undergraduates, post-secondary students, college students, etc. Synonyms for social support included received support, perceived support, enacted support, supportive actions, supportive behaviours, etc., with support by source also searched with terms such as peer, student, parental, family, teacher, professor, faculty, academic, instructor, university, school, and institution support. All search terms, with the exception of relatedness, were truncated to include word variations (e.g., first*year to account for hyphenated and non-hyphenated wording; freshm* to include freshman and freshmen; belong* to include belong, belonging, and belongingness).

2.3. Review Protocols

A total of 94 publications were found in the PsycInfo database, and 210 in the ERIC database, with a total of approximately 125 articles (including theoretical articles) retained following the aforementioned search protocols. Following a second application of the inclusion and exclusion criteria (e.g., filtering out articles that did not measure stress but rather anxiety or depression, removing articles that included first-year students within a larger sample but did not present data specific to first-year students), 53 empirical articles on first-year student stress and social support were reviewed. This final total also reflected the removal of duplicate hits and studies with unreliable reporting (e.g., one study was excluded due to inconsistent discussion of findings in the results versus discussion sections; Dixon Rayle and Chung 2007). The publications found as a result of this search were examined to inform the present review of first-year student stress and social support during the transition to higher education and are reviewed in two sections. Section 3 below provides a review of the research literature on first-year student stress, followed by Section 4 which reviews the existing research specific to social support for first-year students.

3. What Is Stress and What Are the Precursors to Stress for First-Year Students?

3.1. Theoretical Conceptualizations of Stress

3.1.1. A Transactional Model of Stress

Lazarus and Folkman (1984) proposed that stress functions as a bi-directional, reciprocal relationship between an individual and their environment (as opposed to more traditional antecedent-consequence models). They further proposed that the effects of psychological stress on personal well-being and behaviour are mediated by cognitive appraisals and coping strategies. More specifically, individuals' perceptions as to the magnitude of stress imposed on them by transactions within their environment, the causes of those transactions, and how they utilize resources in maintaining their well-being in response to environmental demands should mitigate the effects of stress on psychological adjustment. Lazarus and Folkman (1984) also assume stress to be part of a process, rather than a static variable. In this dynamic view, stress and stressful situations evolve as a function of an individual's changing relationship with their environment. As such, their transactional model of stress specifies that distinct cognitive mediators (i.e., appraisals, coping, perceived support) are evaluated continuously by individuals throughout a stressful event.

Furthermore, sources of stress are presumed to change throughout the lifespan, as are individuals' capabilities of coping with stress. Sources of stress, also referred to as stressors, are outlined in this model as environmental demands that elicit stress (a concept derived from stimulus-response definitions of stress), with such stressors varying in duration and as a function of individual differences in vulnerability to stress. They also propose that due to these variations, generalizations of how stressful specific environmental factors or events are for people at large are difficult due to the necessary examination of individuals' response patterns (i.e., one's existing personal history with an assumed stressor can mitigate or exacerbate its effects), highlighting the importance of longitudinal assessments of stress in empirical research.

3.1.2. Degrees of Stress

The majority of research on stress in first-year university students has, to date, focused primarily on the negative psychological, cognitive, physical, and behavioural consequences of stressful experiences (e.g., Rice et al. 2015; Sarid et al. 2004). However, many researchers have acknowledged that not all stress is detrimental to well-being and achievement (Robotham 2008) and suggested that an optimal amount of stress can be motivating in achievement settings (Gibbons 2012). In early research on physiological responses to stress, Selye (1976) has argued that a moderate degree of stress is not only beneficial, but a necessary part of life. According to Lazarus and Folkman (1984), stress occurs when the demands of a stressor are perceived to exceed one's resources and endanger one's well-being regardless of if the stressor is generally considered acute (e.g., an exam) or chronic (e.g., prolonged financial

instability), minor (e.g., traffic) or severe (e.g., loss of a loved one). This transactional model of stress further asserts that variability in individual appraisals and coping play a vital role in determining if a stressor elicits a stress response. For example, a specific minor stressor may be highly stressful for one individual but may not be perceived as stressful by another due to differential coping strategies (e.g., positive reappraisal).

3.1.3. Delineating Stress from Anxiety, Depression, and Distress

There exists to date long-standing theoretical distinctions between stress, anxiety, and depression. Whereas stress is assumed to induce more specific feelings of anxiety in a given context, long-term stress is outlined as potentially leading to depression (Wheatley 1997) and distress is commonly understood as a more general negative state that can include either anxiety or depression (Mirowsky and Ross 2017). Nevertheless, these three concepts are often intertwined in empirical research, particularly with respect to the measurement of stress. For example, emotional distress (e.g., Rutledge and Sher 2001), as well as depression and anxiety (e.g., Krieg 2013; O'Hare and Sherrer 2006), have previously been measured as indicators of stress. Despite the confounding nature of such empirical decisions, it is important to note that these constructs have consistently been theoretically differentiated with respect to the processes implied.

Anxiety, depression, and indicators of psychological distress are each specifically conceptualized in prominent theoretical frameworks as *outcomes* of prolonged stress with which an individual is not able to cope (Lazarus 2000; Lazarus and Folkman 1984). Moreover, these constructs have been further distinguished from stress in that they are considered emotions more closely associated with clinically significant psychological disorders (e.g., distress and psychopathology; Bynum et al. 2007, p. 65). According to Cohen et al. (1983), although stress may be a symptom of psychological disorders, "the perception of stress itself . . . is not a measure of psychological symptomology" (p. 394). Keeping with this distinction, the widely used Depression Anxiety Stress Scale (DASS; Lovibond and Lovibond 1995) consistently demonstrates a factor structure differentiating between each construct (e.g., indicators of dysphoric mood for depression, physical arousal for anxiety, and reactions to negative events for stress; Antony et al. 1998). For the purpose of this review, stress was thus defined as a process involving cognitions and behaviours in direct response to demand for change, whereas anxiety, depression, and distress were understood to be subsequent emotional responses to stress and beyond the scope of this review (Lazarus and Folkman 1984; Robotham 2008; Simons and Gaher 2005).

3.2. Empirical Research on First-Year Student Stress

The following sections first outline the methods used to assess student stress in published research, which is followed by a synthesis of empirical findings on the antecedents and correlates of stress in first-year students. The most prominent theoretical framework informing the empirical studies reviewed was Lazarus and Folkman's (1984) transactional stress model, specifically their definition of stress (e.g., Bojuwoye 2002; Wilson and Pritchard 2005). However, a number of studies adopted alternate theoretical perspectives such as Self-Control (Achtziger and Bayer 2013) or Action Control (Ruthig et al. 2009). Additionally, most research with first-year students has examined stress using self-report questionnaires (e.g., Heikkilä et al. 2011; Palmer and Rodger 2009; Sy et al. 2011), with longitudinal studies having examined causal relationships involving stress (e.g., Ciarrochi and Scott 2006; Ruthig et al. 2009). For a detailed outline of empirical articles on first-year student stress reviewed in this section, see Appendix A, Table A1.

3.2.1. Measurement of Student Stress

The Perceived Stress Scale (PSS; Cohen et al. 1983) measures "the degree to which situations in one's life are appraised as stressful" (p. 394), and is one of the most commonly used self-report assessments of first-year student stress (e.g., Filipkowski et al. 2016; Kennedy and Tuckman 2013; Miczo et al. 2006; Petersen et al. 2009; Stupnisky et al. 2013). The

PSS assesses global stress in terms of the frequency of cognitions and emotions generally experienced by an individual during the past month. The types of emotions assessed include feeling upset, stressed, and angry, whereas items pertaining to cognitions include perceptions of control and ability to cope with responsibilities or irritations. Additionally, researchers have modified PSS items to reflect a particular type of stress (i.e., academic stress; Rice et al. 2015), removed items to create a brief version of the scale (e.g., Gallander Wintre et al. 2011; Gordon et al. 2020; Maymon et al. 2019; Ruthig et al. 2009), and translated items into other languages (e.g., Turkish; Örücü and Demir 2009; Spanish; Raffaelli et al. 2013).

Other measures used to evaluate first-year university students' stress include the Depression, Anxiety, Stress Scale (DASS; Lovibond and Lovibond 1995; administered by Ciarrochi and Scott 2006) and the Scale of Psychological Distress (SPD; Ben-Sira 1979) assessing physiological symptoms of stress before, during, and after exams (e.g., headaches, insomnia; Sarid et al. 2004). The Arnetz and Hasson Stress Questionnaire has similarly been used to assess student stress with regard to health status, sleep quality, ability to concentrate, stress and energy, perceptions of control, and social life in first-year Swedish university students (Andersson et al. 2009). Stress in freshmen has also been measured with scales focusing on perceptions of negative life events as stressful (Life Events Survey; Sarason et al. 1978; used by Rutledge and Sher 2001), with studies also exploring stressors specifically experienced by minority first-year students (Minority Student Stressors Scale; Saldaina 1994; used by McGonagle et al. 2014). Measures have also included a specific emphasis on emotional distress (General Severity Index of the Brief Symptom Inventory; Derogatis 1993; used by Rutledge and Sher 2001) or recent academic challenges (e.g., struggling to meet personal academic standards; Survey of Recent Life Experiences: Kohn et al. 1990; used by Wilson and Pritchard 2005).

Longitudinal research with freshmen by Akgun and Ciarrochi (2003) specifically examined stressful events experienced in educational contexts using the Undergraduate Stress Questionnaire (USQ; Crandall et al. 1992), with Pluut et al. (2015) assessing studying-related stressors using the Graduate Stress Inventory (GSI; Rocha-Singh 1994). Social stress has also been specifically measured with college students (Social Stress Questionnaire; SSQ; Connor-Smith and Compas 2002), as have measures of social stress specific to different sources of stress (e.g., school, family, work; Sy et al. 2011). Measures of stress have also been developed for a specific study, for example, the Stressful Experiences of First Year Students Questionnaire was created by Bojuwoye (2002) to assess five types of stressors: physical/environmental, administrative/process, academic demands, personal psychological/social relationship, and financial/support difficulty. The Stress Overload Scale (SOS) was similarly developed for research with first-year students by Amirkhan and Kofman (2018), this scale consists of two subscales evaluating event load (i.e., perceived burden of demands) and personal vulnerability (i.e., perceived insufficiencies in resources).

Single-item measures of students' stressors and ability to cope have also been employed in research on first-year student stress (Garett et al. 2017). Specifically, Garrett et al. administered weekly ratings of how stressed students were with respect to their academics, finances, employment, family, friends, "the need to fit in," and self-image. Although the majority of studies reviewed used Likert-type scales to measure perceived stress, qualitative research has also identified stress as a common theme in assessments of health and well-being in first-year students. For example, coding schemes developed by Wrench et al. (2013) to interpret open-ended responses by students during their transition to university employed a grounded theory approach that identified multiple themes including stress as well as relocation, connections to university, physical activity, and diet. Beyond self-report measures, physiological measures have also been used to assess stress in university students (e.g., cortisol levels in saliva; Lester et al. 2010).

3.2.2. Precursors and Correlates of Student Stress

Empirical research that identifies precursors to stress, as well as correlates, is outlined below according to psychological versus contextual precursor variables. For clarity, a precursor is understood as a variable that has been causally linked via longitudinal or experimental data (e.g., naturally occurring or experimentally manipulated precursors) and analysed as a hypothesized predictor of stress either directly or indirectly through other mediating variables. Correlates of stress, on the other hand, are variables that have been found to be statistically correlated with stress either in studies with one time point or in longitudinal studies with correlational analyses. General group differences (e.g., males vs. females, athletes vs. non-athletes) and classifications (e.g., latent psychological profiles), as well as qualitative and descriptive information, are also presented in the sections below.

Contextual antecedents and correlates. Research on contextual antecedents and correlates of stress experienced by first-year university students has mainly identified contexts that correspond with greater stress, with the exception of social support that has been frequently associated with lower stress levels. For instance, parental support has been linked to first-year students' stress in the U.S., with Sy et al. (2011) showing higher perceptions of parental *emotional* support correlates with lower overall stress levels in first-year, first-generation female students. In contrast, these authors found parental *informational* support (i.e., guidance on college decisions and preparation) was not related to stress for first-year students. With respect to actual support received, a recent study with first-year students attending U.S. and Canadian institutions revealed that higher quality support (i.e., support matching the needs of students) was correlated with lower stress when the support received came from faculty and/or staff (Maymon et al. 2019). In another study with first-year students in Mexico, correlational evidence showed social support from family to especially buffer against the negative effects of stress on depressive symptoms (Raffaelli et al. 2013). Miczo et al. (2006) similarly found higher support received from parents at the beginning of students' first semester to predict lower stress at the end of the semester in the U.S.

Concerning contextual stressors at the institutional level, Wrench et al. (2013) found Australian first-year students reported higher levels of stress due to lack of information on how to meet university expectations, due dates that were too close together, and inconsistencies between courses. Research with first-year students in the U.K. by Gibbons (2012) showed students' ratings of social opportunities with peers perceived as 'uplifting' rather than a stressor or hassle (i.e., institutional opportunities to interact with other students via social events, clubs, societies, etc.) and university support (i.e., available facilities) corresponded with stronger feelings of intellectual motivation and belonging within the learning community. Conversely, reported hassles related to course delivery (i.e., learning materials and pedagogical strategies) were found to correspond with a lower sense of belonging. Additionally, these researchers found intellectual motivation to positively correspond with supportive personal and family relationships in first-year students.

With respect to relations with students' sense of school belonging in particular, a longitudinal study with self-report questionnaires completed two and eight weeks into the semester by U.S. business majors showed a higher sense of school belonging to buffer against negative effects of perceived stress on first-semester GPA (Kennedy and Tuckman 2013). Structural equation modelling (SEM) showed school belonging to mediate the positive effects of self-efficacy on GPA, whereas higher levels of procrastination predicted lower perceptions of school belonging and higher stress. Additionally, higher academic value and concerns over social exclusion predicted a stronger sense of school belonging, with reports of belongingness being positively correlated with both mastery and performance goal orientations eight weeks later.

Concerning non-academic contextual correlates of stress, financial responsibilities were consistently identified as a stressor in a study evaluating the Stressful Experiences of First Year Students Questionnaire with first-year students from five universities in South Africa (Bojuwoye 2002). Specifically, financial difficulties and lack of financial

support corresponded with notably higher stress ratings than stressors involving physical infrastructure, administration, academic demands, and personal/social factors. With respect to the role of financial stressors specifically, general perceived stress was similarly found to be the strongest predictor (as compared with intrinsic motivation, self-esteem, academic overload) of poorer grades and psychological adjustment to college among first-year South African students receiving financial aid (Petersen et al. 2009). However, a follow-up study found no relationships between first-year stress levels and academic progress three years later (i.e., course completion; Petersen et al. 2010), suggesting that students may be more susceptible to negative effects of stress during their first year of post-secondary studies.

Beyond financial contexts, participation in extracurricular activities has also been studied in relation to stress, with exploratory findings showing first-year varsity athletes to rate sources of stress differently compared to non-athletes (Wilson and Pritchard 2005). More specifically, athletes tended to report more stress due to conflicts with family, having various responsibilities, not enough time for sleep, and heavy demands from extracurricular activities compared to non-athletes. In contrast, non-athletes reported more stress than athletes over financial burdens, educational decisions, social conflicts with peers, social isolation, and dissatisfaction with physical appearance.

Stress in first-year students has also been examined in relation to non-academic physiological correlates. In a study involving physiological measurement of stress effects on the immune system, saliva samples of first-year occupational therapy students in the U.S. showed significant changes in stress hormones (e.g., cortisol) over the first semester (Lester et al. 2010). Specifically, cortisol levels were highest immediately prior to students' first exam but decreased throughout the semester, suggesting that effects of exam stress on students' immune system may be most evident at the beginning of the semester. In summary, contextual antecedents of stress ranging from course exams to non-academic challenges (e.g., financial), as well as stress-related correlates such as social support and extra-curricular activities, have been found to covary significantly with higher stress levels in first-year students.

Demographic and achievement variables. Consistent with recent research examining stress inequalities in college students across the U.S. in the time of COVID-19 (Hoyt et al. 2021), research on how demographic variables predict first-year student stress shows female students report higher stress levels relative to males (e.g., Andersson et al. 2009; Bojuwoye 2002; Raffaelli et al. 2013; Rice et al. 2015). Concerning first-year students' ethnic background and stress, a longitudinal study of Latinx first-year students in the U.S. found perceived stress to be positively correlated with discrimination, poor sleep patterns, as well as symptoms of depression and anxiety (Gordon et al. 2020). Another longitudinal study by Filipkowski et al. (2016) on the transition to college among ethnic minority students in the U.S. found stress to mediate the relationship between adverse life experiences (e.g., illness, family death or divorce) and changes in physical health problems (e.g., insomnia, indigestion). Students who experienced more adverse life events tended to report higher levels of stress that, in turn, predicted more physical illness symptoms over the course of their first semester. Similarly, a study with African American students found higher levels of stress to be significantly correlated with more frequent experiences of racism, as well as lower family income (Bynum et al. 2007).

With respect to links between stress and academic achievement, a study with Canadian students showed those who maintained their high school GPA during their first semester have significantly lower perceived stress than those who showed GPA declines (at least one letter grade; Gallander Wintre et al. 2011). Considering that over 70% of participants experienced a decrease in GPA in their first year relative to high school, these findings suggest that poor academic performance is a likely common contributor to stress in first-year students. Similarly, research with students attending a U.S. university found stress overload (measured as demand burden and lack of coping resources) to significantly correlate with lower first-term GPA (Amirkhan and Kofman 2018). A follow-up survey completed by the same students similarly revealed second-term stress overload corre-

sponded with lower second-term GPA and cumulative GPA that, in turn, both predicted greater risk of attrition by the second year. Longitudinal findings from Rice et al. (2015) with first-year U.S. students in STEM programs further showed students with greater stress obtained lower GPAs, with increased stress throughout the academic year also linked to lower GPA levels.

Psychological antecedents and correlates. Research with first-year university students has additionally examined cognitive (e.g., self-esteem, perceived control) and behavioural (e.g., coping strategies) psychological antecedents and correlates of stress. For example, longitudinal research with Canadian university students found high self-esteem in the first month of studies corresponded with lower perceived stress six months later (Stupnisky et al. 2013). Additionally, self-report data from first-year science, humanities, law, and economics students showed correlational evidence that self-control may mediate the relationship between perfectionism and perceived stress (Achtziger and Bayer 2013). Specifically, although students with high academic standards tended to report higher self-control and lower stress, students who also reported dissatisfaction with their performance in relation to their high personal standards reported lower self-control and higher stress.

According to Lazarus and Folkman (1984), perceived control is closely related to stress and is defined as a psychological construct that reflects one's persistent beliefs of being able to predict or influence salient environmental outcomes (e.g., academic performance). However, due to a perceived loss of control that is often considered part of the definition of stress itself (Lazarus and Folkman 1984), this conceptual issue has complicated the examination of perceived control as a psychological predictor, correlate, or outcome of stress due to it often having already been included in self-report measures of perceived stress (e.g., PSS; Cohen et al. 1983). To address this methodological confound, longitudinal research with first-year students in Canada (Ruthig et al. 2009) assessed these variables independently and showed initial levels of perceived academic control to partially mediate the benefits of optimism and perceived available support on general stress reported by students at the end of the academic year. Research with Finnish first-year students enrolled in faculties of law, arts, and agriculture similarly found students who reported higher levels of learned helplessness (i.e., latent profiles across learning, regulation, cognitive, attributional variables) reported significantly higher stress levels (Heikkilä et al. 2011).

Longitudinal research with first-year, female nursing and physiotherapy students in Israel also showed self-reported denial coping to moderate changes in immune system functioning during times of academic stress (e.g., exams; Sarid et al. 2004). In this study, denial coping was found to buffer against changes in viral antibodies during exam periods, suggesting that denial could be beneficial when coping with short-term stressors (see Lazarus and Folkman 1984). In contrast, emotion-focused coping was less effective in eliciting adaptive salivary antibodies, with problem-focused coping predicting no significant changes in self-report or salivary measures. Research with first-year Canadian students living in campus residences similarly showed avoidance coping, as well as emotion-focused coping, to be associated with lower stress levels (Palmer and Rodger 2009). Whereas denial and avoidance may be adaptive for stress in the short term, findings also show approach/engagement strategies such as problem-focused coping to be adaptive in the long-term (see Suls and Fletcher 1985 for a meta-analytic review). For example, a longitudinal study with first-year Australian students found more effective problem solving to predict lower stress (Ciarrochi and Scott 2006), with "learned resourcefulness" (a composite measure encompassing problem solving, self-efficacy, delay of gratification, and emotion regulation) mitigating the negative effects of high stress levels on GPA in Australian first-year students (Akgun and Ciarrochi 2003).

Perfectionism was similarly found by Rice et al. (2015) to moderate the effects of academic stress on GPA in a longitudinal study with first-year STEM students, with students who reported adaptive perfectionism experiencing low to moderate stress, and students who reported maladaptive perfectionism reporting greater stress levels. Students' expectations pertaining to their academic performance in their first year of university have also been

examined in relation to stress. In a qualitative study with Australian first-year students, participants consistently expressed feeling stressed as a result of perceived discrepancies between their expected versus actual work demands/performance (Wrench et al. 2013). One student, for example, stated, "I didn't think it would be so stressful or time consuming" (p. 735). Overall, the psychological antecedents and correlates examined in existing research on first-year student stress have ranged from personal perceptions of self-esteem and control (e.g., learned helplessness) to coping strategies and behaviours (problem- and emotion-focused) as well as perfectionism and academic expectations.

3.3. Synthesis and Critique

Overall, research on first-year university student stress between 1996 and 2020 has been primarily conducted via self-report methods, as well as with a few studies utilizing physiological data (e.g., Lester et al. 2010; Sarid et al. 2004). Stress related to academic tasks, extracurricular activities, and finances, as well as significant findings suggesting benefits of social support and a sense of school belonging, were common contextual issues examined throughout the empirical research on first-year university student experiences. Demographic variables pertaining to ethnicity, gender, and prior academic achievement were also frequently examined in research on first-year student stress, with psychological factors being regularly explored in relation to first-year stress including self-esteem, perceptions of control, coping strategies, perfectionism, and expectations.

These findings concerning contextual correlates of first-year student stress are consistent with those described in a review of stress among post-secondary students by Robotham (2008) who identified stressors related to studying, exams, the transition to university, and finances to be consistently reported by university students over a span of 20 years. The present themes also reflect those identified by Tinto (2001) in his seminal review of contributors to first-year student retention. Beyond academic difficulties, Tinto identified varied factors that predict first-year student attrition such as adjustment difficulties, personal goals, academic and personal commitments, finances, sense of belonging, campus involvement, and learning experiences. Although samples in the studies reviewed above were heavily drawn from psychology classes (e.g., Filipkowski et al. 2016; Gibbons 2012; Ruthig et al. 2009; Stupnisky et al. 2013), the studies reviewed also sampled from other disciplines (e.g., nursing, law, social work) and specific subpopulations including first-year athletes (Wilson and Pritchard 2005), students in campus residences (Palmer and Rodger 2009), first-generation women (Sy et al. 2011), and financial aid recipients (Petersen et al. 2009). Multiple studies also consisted of first-year students from countries outside of North America such as Australia (Akgun and Ciarrochi 2003), Finland (Heikkilä et al. 2011), Israel (Sarid et al. 2004), South Africa (Bojuwoye 2002), and the United Kingdom (Gibbons 2012).

Concerning other methodological limitations of the studies reviewed, the stress measures administered were typically not specific to academic issues and were retrospective in nature. Although a few studies attempted to examine specific types of stress experienced by first-year students (e.g., social stress; Connor-Smith and Compas 2002; Lester et al. 2010; Rice et al. 2015), most studies used the PSS to assess general life-related stress. Relatedly, some studies assessed overall physical health or illness symptoms as measures of stress (Andersson et al. 2009; Sarid et al. 2004) thus confounding more specific examination of the effects of stress on students' health. Regarding retrospective assessment, typical measures of global stress often require students to reflect upon the previous month (e.g., PSS). Accordingly, these measures lack a level of specificity otherwise obtained with more time sensitive experience sampling methods (i.e., state assessments) that can provide greater insight into temporal relations between stress and its precursors (Lazarus and Folkman 1984).

The aforementioned studies are also limited due to their primarily cross-sectional nature, with more longitudinal studies required to better evaluate the development of stress in first-year students over time in relation to precursors and specific transitional challenges (e.g., course withdrawal deadlines, choosing a major). Studies with first-year students could benefit from the causal evidence afforded by repeated assessments, such

as in a 10-week diary study with U.S. undergraduates (Garett et al. 2017) showing peaks in stress during exam periods due to poor sleep quality, limited exercise, and maladaptive coping (e.g., internet use, isolation). Although multiple reviewed studies contained longitudinal designs (e.g., Filipkowski et al. 2016; Gordon et al. 2020; Rice et al. 2015; Stupnisky et al. 2013), the methods used often prevented analyses that explored if stress-related variables (e.g., coping strategies, physical health) served as antecedents, correlates, or consequences of students' stress levels (e.g., an initial assessment of stress followed by outcome variables assessed at a later time-point). Overall, as the reviewed studies relied primarily on cross-sectional assessments of self-report measures of stress that were highly general and retrospective in nature, further research to evaluate stress in first-year students using real-time assessments (e.g., experience sampling methods) and mixed-methods approaches (i.e., combing quantitative responses with qualitative interviews) is needed.

4. How Do First-Year Students Use Social Support to Cope with Stress?

4.1. Social Support and School Belonging Interventions

For the purpose of this review, social support is defined according to Lakey and Cohen (2000) as resources from one's social environment (received or perceived) that influence appraisals or coping related to stress. Through the lens of Lazarus and Folkman's (1984) transactional stress model, Lakey and Cohen consider social support to be an aspect of the social environment that one must make an intentional effort to utilize as one of several possible coping resources. In further expanding upon the transactional stress model, Lakey and Cohen frame social support both as supportive actions by others that facilitate one's ability to cope with a stressful situation and as perceptions of available support that influence one's appraisals of a stressful situation to be less negative. Accordingly, social support is proposed to indirectly moderate the effects of stress on health via appraisals and coping such that higher levels of perceived available support should lessen the magnitude to which events are appraised as being stressful and higher levels of received support (i.e., frequency or quality of support) should enhance coping abilities, a process that, in turn, prevent negative effects of stress on long-term mental and physical health.

The stress-support matching hypothesis proposed by Cohen and McKay (1984) additionally proposed that the effectiveness of specific coping strategies is contingent upon the nature of support received matching the specific demands of the stressor in question (e.g., financial support as a match for financial stress). Social support has also been further categorized according to the function of the support provided with respect to emotional, instrumental or tangible, informational, and companionship support, as well as validation (e.g., feedback, social comparison; Wills and Shinar 2000). While Lazarus and Folkman (1984) identified the presence of a social network as an antecedent in their transactional stress model, Lakey and Cohen further emphasize that having a relationship does not guarantee that one will receive adequate support due to significant variability in the number and types of one's supportive relationships (i.e., peers vs. counsellors vs. family) and perceptions as to the quality of support provided (e.g., helpful vs. distracting). By and large, social support has been consistently linked in existing theoretical traditions to stress and coping, with the nature of received social support (e.g., support matching) having been repeatedly identified as critical to understanding the effectiveness of social support in facilitating subsequent well-being levels.

In addition to general resources of perceived available support as provided by one's social environment, a related construct that appears frequently in empirical research on first-year students' stress is belonging. Specifically, belonging support is a form of social support commonly provided at the institutional level that involves intervention programs specifically aimed at fostering a sense of school belonging through formal opportunities to receive peer, faculty, and staff support (e.g., mentorships, cohort programs; Cornelius et al. 2016; McGonagle et al. 2014; Ricks et al. 2014). Whereas social support is typically operationalized as an action, either received in the past or anticipated in the future, belonging is instead commonly conceptualized as a feeling that arises as a result

of support (Cohen and McKay 1984). Accordingly, empirical research investigating institutional belonging support has often focused on the effects intervention programs with respect to students' participation in such programs and their self-reported sense of school belonging following the intervention.

A sense of belonging in college or university settings has been defined as "the extent to which students feel personally... supported by others in the school social environment" (Goodenow 1993, p. 80), in addition to feeling accepted, respected, and included. In his classic model of student retention, Tinto (1998) proposed that learning communities (or cohorts) implemented during the first year should be incorporated to increase student retention, and that collaborative group work within these communities allows students to develop close relationships with their peers and faculty. As such, students are assumed to be more likely to form social groups outside of the classroom, but within the larger context of the school setting, with these extracurricular relationships further assumed to enhance academic and social support as ad hoc learning communities. Social support and belonging are thus deeply integrated constructs to the extent that perceptions of being supported by a social group or institution are included in some definitions of belonging (e.g., Goodenow 1993). Accordingly, due to similar concepts and terminology having been used in published research on school belonging support (e.g., belonging intervention vs. institution-specific social support or belonging support), empirical findings on first-year students' sense of belonging are outlined below.

4.2. Empirical Research on Social Support with First-Year Students

The reviewed empirical research on social support among first-year students to date consists of mostly longitudinal studies including multiple projects evaluating school belonging interventions utilizing self-report questionnaires, as well as one-time studies with similar measures. Most of the studies reviewed were informed by theoretical frameworks of Lakey and Cohen (2000; e.g., Mackinnon 2012; Raffaelli et al. 2013) and Tinto (1998; e.g., Nicpon et al. 2006; Thompson 2008), although a number of studies were also examined that referenced other frameworks, such as those pertaining to job-demands resources (Pluut et al. 2015), learning communities (Ricks et al. 2014), planned behaviour (Purswell et al. 2008), and social capital (Toews and Yazedjian 2007). For a detailed outline of all empirical articles on first-year student social support reviewed in this section, see Appendix A, Table A2.

4.2.1. Measurement of Social Support

Both general perceived available social support and students' perceptions with respect to specific sources of support have been assessed in research with first-year university students. For example, general perceptions of support have been examined in previous research using a modified short version of the Social Provisions Scale (Cutrona and Russell 1987) that includes items such as "There are people I can count on in times of trouble" (Mackinnon 2012; Spanish translation: Raffaelli et al. 2013). In terms of specific sources of support, the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al. 1988) is one of the most commonly used self-report measures in research with first-year students (e.g., Dawson and Pooley 2013; Friedlander et al. 2007). The MSPSS assesses perceived social support with three subscales each reflecting perceived available support from family, friends, and significant others. Self-report measures have also been developed to specifically examine received support in terms of both frequency and quality from family, friends, faculty/staff, and institution for first-year students (Maymon et al. 2019).

Support specific to family and friends has been assessed in first-year students by Nicpon et al. (2006) with the Perceived Social Support Inventory–Family and Friends (PSS; Procidano and Heller 1983), perceived parental support was measured by Miczo et al. (2006) with parallel scales rating both desired and received support. Peer support for first-year students was also assessed by Purswell et al. (2008) and Toews and Yazedjian (2007) using the Michigan State University Freshmen Assets Survey (Villarruel and Gardner 2003), with

these studies further assessing parental support using the Parents as Sources of Support sub-scale of the Parental Attachment Questionnaire (Kenny 1987). Friendship quality has also been assessed using the McGill Friendship Questionnaire-Friend's Function (Mendelson and Aboud 1999) as an overall indicator of first-year students' perceptions of the quality of their friendships (Mounts et al. 2006). Perceived institution-level support has also been assessed for Australian first-year students, specifically in relation to a formal social support intervention aimed at fostering faculty and peer support through structured mentorship activities (Cornelius et al. 2016).

Research exploring the effects of social capital on first-year student grades at a Dutch university further assessed financial support received from family, mentorship support received from faculty (emotional and academic support), and peer support from other students (Brouwer et al. 2016). With respect to the measurement of students' sense of belonging, most studies utilized a modified version of the Psychological Sense of School Membership (PSSM; Goodenow 1993) that was originally created to assess school belonging for middle school students and adapted for first-year college students (e.g., Kennedy and Tuckman 2013). Additionally, school belonging has been measured with questions relating to how much students feel like part of the campus community (Mounts 2004) using a version of the Organizational Commitment Scale (Meyer et al. 1993) modified for university/college experiences (e.g., "I feel like 'part of the family' at this college/university"; McGonagle et al. 2014).

In addition to self-report measures, social support in first-year students has been investigated using qualitative methods in a study by Pancer et al. (2004) who examined responses to open-ended questions alongside the Social Provisions Scale (Cutrona 1984), a measure of general social support perceptions. Open-ended questions have also been used to qualitatively assess social support (e.g., semi-structured interviews with probing questions; Sevinç and Gizir 2014) and the effectiveness of a learning community-building intervention for first-year students (Ricks et al. 2014). Similarly, Thompson (2008) paired diary entries with a subsample of interviews in a study exploring the ways in which academic support was received by first-year students. Overall, measures of social support for first-year students in published work has consisted mainly of scales assessing perceived available support and, to a lesser extent, received support as rated on Likert-type scales, with selected studies also utilizing diary and interview responses to open-ended questions.

4.2.2. Sources of Social Support

Empirical findings involving first-year university students' experiences of social support as afforded by the aforementioned assessment protocols are categorized below according to the source of support. Findings from research examining a singular source of support (i.e., from peers, family, faculty/staff, or institution) are reviewed first, followed by a review of findings contrasting multiple sources of support for first-year students.

Peer support. A qualitative, cross-sectional study by Thompson (2008) explored the ways in which first-year students in the U.S. provide academic support to other students using diary entries and interviews. With respect to why students may receive more support from peers than faculty, one student attributed this to a lack of access to faculty due to class size. Initiation of support was fairly balanced, with 37% of students reporting themselves as soliciting peer support, 34% reporting peer support interactions initiated by others, and 29% reporting mutual initiation. Academic peer support was largely spontaneous in nature, with 69% of interactions reported as unplanned, and occurring most frequently in students' residences (42%) at night or on weekends. Most interactions reported in diary entries were face-to-face (83%) with interviews revealing an additional integration of computer mediated social interactions (e.g., e-mail, Facebook). Students reported participating in two types of action-facilitating peer support (i.e., informational and tangible) and two types of nurturing support (i.e., motivational support and venting frustrations). Informational support included actions such as answering questions about an exam and giving advice

on specific study strategies, whereas tangible support involved actions such as working together on an assignment and walking another student to class.

In a quantitative study by Hartung et al. (2015), first-semester psychology students in Germany completed 10 bi-weekly ratings of perceived peer inclusion and health indicators. Findings showed students' perceptions of social inclusion to be predicted by actual inclusion as rated by their peers, with more well-liked students perceiving greater inclusion by their peers. Perceived inclusion further significantly predicted better self-rated health and mediated the beneficial effects of actual inclusion on health. Research with Canadian first-year students also showed higher social, personal-emotional, and overall university adjustment, as well as lower depression levels, to be predicted by increases in social support from friends from the first to second semester (Friedlander et al. 2007). A study by Pluut et al. (2015) with Dutch students in a first-year organizational behaviour course similarly found that students who perceived stronger social support from their in-class study groups also reported higher academic satisfaction.

A similar peer support study found U.S. freshmen who participated in a support intervention consisting of meeting peers for discussions over nine weeks during their first semester to report lower levels of loneliness in their second semester and higher GPAs in their second year (Mattanah et al. 2012). Intervention group discussions were facilitated by more advanced psychology students and included topics related to social relationships, academics, expectations, values, and campus resources. Generally speaking, first-year student peer support has been linked to more positive perceptions of inclusion (self-report and peer triangulated) and academic outcomes (e.g., academic satisfaction, GPA), with qualitative research further highlighting the dynamic nature of academic peer support.

Family support. Parental support has also been identified as playing an important role in students' transition to higher education. For example, findings with first-year students at two universities in the U.S. (Miczo et al. 2006) showed higher received parental support at the beginning of the semester to predict lower student stress at the end of the semester. Higher received support from parents was also linked to increased student tendencies to seek medical attention when sick and a decreased tendency to deny illness symptoms. Mounts (2004) additionally found greater perceived parental support to correspond with lower depression and loneliness for African American and Caucasian first-year students, with a stronger sense of school belonging mediating the effects of parental support on student well-being. Follow-up work by Mounts et al. (2006) also showed high perceived parental support to be associated with higher quality friendships and lower depression, with low parental support being especially detrimental for anxiety in African American students who reported higher levels of sociability. In brief, parental support is typically associated with more positive well-being indicators (e.g., lower stress, depression, loneliness; greater belonging) in first-year students.

Faculty support. A qualitative investigation by Longwell-Grice and Longwell-Grice (2008), informed by Tinto's (1998) theory of student retention, examined case studies of male, working-class, first-year students concerning their perceptions of faculty support. Study findings showed first-year students to be hesitant in seeking faculty support, with interview responses suggesting that this hesitation was due to perceptions of faculty not caring about student concerns or not wanting to be bothered. Findings from this study are thus consistent with Thompson's (2008) qualitative study in which students reported receiving more support from peers than faculty due to perceived lack of access and familiarity with faculty resulting from large class sizes. No other published empirical studies to date have exclusively examined faculty support of first-year students.

Institution support. Concerning the development of first-year students' sense of school belonging, a number of intervention studies have examined effects of programs designed to foster social support. Quantitative assessments of school belonging interventions suggest various potential benefits for first-year students, including longitudinal findings that show that African American students' sense of school belonging buffers against the negative effects of adversity on GPA following their participation in a support program

(Walton and Cohen 2011). The intervention provided second-semester students with narratives portraying the experience of social adversity as common and temporary, after which students wrote and read aloud an essay on similar personal experiences. Both Caucasian and African American intervention participants obtained higher GPAs at the end of their senior year than the control group, with only African American students in the control group reporting significantly lower perceived school belonging 3 years post-intervention compared with the intervention group. African American students from the intervention group also reported better health and fewer doctor visits at the end of their senior year than their peers in the control group.

A similar intervention study by Walton et al. (2015) found a social belonging intervention with narratives aimed at reducing feelings of adversity predicted higher GPAs for first-year Canadian students in an engineering program. The social belonging intervention materials were derived from the above-mentioned study by Walton and Cohen (2011), with the addition of statements specific to gender equality regarding first-year transition experiences (e.g., that both male and female students worried about being treated with respect). By the end of their first year, women who participated in the intervention had significantly higher GPAs, attributed less importance to negative events, and reported higher self-esteem over the 12 days following the intervention than women in the control condition. Women in the intervention group also reported more friendships with male engineers and less of a decline in perceptions of women's value in engineering compared to controls. In sum, support from first-year students' institutions has been examined in the form of school belonging interventions that have shown positive effects on academic achievement (GPA) and physical health, especially for at-risk students (e.g., African American students, women in STEM).

Multiple sources of support. Intervention research on institutional efforts to foster an enhanced sense of belonging in first-year students has also addressed the combined effects of multiple sources of support on student development (e.g., faculty, peer, and parental support). For instance, qualitative assessments of a learning community intervention aimed at supporting retention identified peer study groups, mentoring, and tutoring to be important aspects contributing to persistence and academic success for first-year students in a U.S. engineering program (Ricks et al. 2014). Students who participated in the program attended the same course sections, received scholarships and academic support, and were provided study space, faculty advisors, and weekly study sessions. Retention and graduation rates for the learning community participants were higher in comparison with other students in similar programs at the same institution.

A program aimed at increasing STEM enrolment and persistence for U.S. university and community college students revealed similar findings over a two-year period (McGonagle et al. 2014). The Science Technology Reaching Out to New Generations in Connecticut (STRONG-CT) program provided academic, social, and financial support to students through academic advising, individual tutoring, research opportunities, mentorship with more senior students and STEM professionals, professional development workshops, community directed enrichment courses, and book stipends. When compared to controls, students who participated in the STRONG-CT program reported spending more hours per week studying, fewer stressors, and higher academic self-efficacy, with interaction effects showing that the intervention buffered against increased stress otherwise experienced by control participants.

Another intervention study by Cornelius et al. (2016) outlined the institutional development of a formal peer support and faculty mentoring program for first-year students at an Australian university. The First STEP (Striving Toward Excellence Program) initiative encouraged students to meet with academic and peer mentor groups up to three times during their first semester. Survey responses indicated positive experiences in the program (e.g., building relationships with peers) with a thematic content analysis of open-ended responses showing discussion of career options, personal issues, and study strategies to be especially beneficial. Benefits of peer and faculty support were also reported by Lucas

and Robinson (2002) who evaluated an intervention aimed at increasing retention among first-year education students. Findings showed that students reported a greater sense of community as a consequence of the emotional and academic peer and faculty support embedded in the social support intervention.

A longitudinal study by Hausmann et al. (2007) further examined an intervention promoting a sense of school belonging for first-year students at a large, public U.S. university. The intervention group received regular correspondence from university administrators emphasizing students' value to the school community and exhibited less of a decline in sense of belonging over time compared to controls. Findings also showed greater sense of belonging at the beginning of the academic year corresponded with more frequent interactions with supportive peers, faculty, and parents, with higher levels of belongingness corresponding with greater student persistence, and increasing parental support corresponding to increased intentions to persist throughout the academic year. Students also generally reported increased interactions with faculty members over time.

Another study by Pancer et al. (2004) evaluated a social support intervention aimed at easing the first-year transition to university in Canada. Students in the intervention condition met weekly with peers in small groups with a graduate or senior undergraduate student facilitator in meetings formally organized by the university throughout their first semester. Surveys completed over four years revealed intervention participants experienced better adjustment and lower attrition throughout their studies compared to the control group (7.8% vs. 28% drop-out rate). Social support from multiple sources was further examined in a qualitative interview study with Turkish first-year students (Sevinç and Gizir 2014) with findings showing students who had difficulties adjusting to university consistently described a lack of support from their faculties and peers. Both individual variables (e.g., loneliness) and institutional factors (e.g., sense of belonging to the university) were identified as critical contributors to students' overall adjustment during the first-year transition.

Aside from intervention studies, recent research with first-year students attending Canadian and U.S. universities examined both the frequency and quality of support received from four sources (family, friends, faculty/staff, institution) in relation to well-being outcomes (Maymon et al. 2019). Results showed support from faculty/staff represented an especially important source of support for first-year students such that high-quality faculty/staff support was correlated with lower stress, burnout, and quitting intentions, and greater feelings of belonging and life satisfaction. Similarly, greater institutional support (e.g., workshops, formal support services) was related to lower burnout and quitting intentions, greater family support was linked to higher life satisfaction, and greater friend support was associated with lower levels of loneliness. Of note in this study is that students' ratings of the quality of support received (i.e., the extent to which the support received matched the students' needs) was significantly correlated with well-being outcomes while controlling for the frequency of support received.

Research with Australian first-year university students similarly found perceived social support from family, significant others, and friends (combined as a general measure) to be positively associated with student resilience (Dawson and Pooley 2013). These findings were echoed in a related study exploring various sources of social capital (i.e., family, faculty, and peers) in first-year Dutch university students (Brouwer et al. 2016) that showed support from peers (help/advice seeking) predicted having more friends that, in turn, predicted higher first-semester grades. Higher ratings of mentorship support by faculty also predicted higher self-efficacy that, in turn, predicted higher first-semester grades. In contrast, research with U.S. college freshmen found that although more social support (i.e., from family and friends) corresponded with greater student persistence, it was not related to GPA (Nicpon et al. 2006). This study also found that female first-year students reported higher perceptions of social support from family and friends compared to male students.

In a four-year longitudinal study with underrepresented racial minority STEM students in the U.S., participation in institutional research support programs (e.g., that provide employment opportunities in relevant fields) significantly predicted greater persistence in STEM (Chang et al. 2014). Belonging to a major-related club or organization, and frequent studying with peers, also positively influenced STEM persistence, albeit to a lesser extent than participation in a research program. Another longitudinal study with female racial minority students in STEM programs across 135 U.S. institutions found discussing course content with peers, joining STEM-related student organizations, research experiences (e.g., assistantships), and the presence of a robust STEM community at the university to also predict greater persistence over a four-year period (Espinosa 2011).

Further evidence of the benefits of social support from multiple sources was observed in a one-year, longitudinal investigation of first- and continuing-generation U.S. college students by Purswell et al. (2008) showing higher parental support to correlate positively with learning intentions regardless of parental education. For students whose parent(s) had at least some college experience, parental support predicted more academic engagement, with peer support instead predicting more engagement for students whose parent(s) had less college experience. A similar study examining Caucasian and Hispanic first-year students at a U.S. college revealed both parental and peer support to correspond with better academic adjustment for Caucasian students (Toews and Yazedjian 2007). However, only peer support was significantly correlated with better adjustment for Hispanic females, and neither parental nor peer support was related to adjustment for Hispanic males. To summarize, research with first-year students shows social support from more than one source to correspond with varied well-being and institutional outcomes (e.g., resilience, adjustment, grades, attrition), with these relations moderated significantly by critical background variables such as race, gender, and parental education.

4.3. Synthesis and Critique

As outlined above, specific sources of support have been examined extensively in research on first-year students' experiences in addition to general support, including peer, family, faculty, classroom, and institutional support. Belongingness in particular was the most common support-related variable examined in studies with first-year students with it often having been conceptualized as an indicator of support (e.g., Hausmann et al. 2007; Lucas and Robinson 2002; Mounts 2004). Furthermore, intervention studies aimed at fostering students' sense of school belonging have been shown to provide emotional and academic benefits for at-risk first-year students (e.g., women in STEM majors). In addition to research involving belongingness, other types of social support experienced by first-year students involving informational and tangible support, as well as encouragement and venting, have also been identified in qualitative assessments (Thompson 2008). Likewise, quantitative assessments of social support have specifically examined tangible (e.g., financial aid; McGonagle et al. 2014), informational (e.g., tutoring; Ricks et al. 2014), and emotional support (e.g., group discussions; Mattanah et al. 2012) in relation to first-year student experiences, as well as validation for socially marginalized student groups (e.g., Walton and Cohen 2011).

In general, social support from peers, family, faculty, and students' post-secondary institution have been linked to better physical health, emotional well-being, adjustment, GPA, and persistence during students' first year of university. Two thirds of the studies reviewed in this section were longitudinal in nature (~50% examined belongingness interventions), with the remaining studies evaluating cross-sectional relations between self-report questionnaire measures. Although samples included students from psychology (e.g., Hartung et al. 2015; Ruthig et al. 2009), business (Kennedy and Tuckman 2013), and STEM programs (e.g., Chang et al. 2014; McGonagle et al. 2014), several studies did not indicate students' faculty affiliations leaving open question as to the generalizability of study findings across disciplines (e.g., Dawson and Pooley 2013; Li et al. 2014; Mackinnon 2012). Studies were nevertheless conducted with first-year students from multiple coun-

tries including Canada (Friedlander et al. 2007), the Netherlands (Pluut et al. 2015), and Germany (Hartung et al. 2015), as well as the United States (e.g., Hausmann et al. 2007; Miczo et al. 2006).

Overall, a majority of the studies conducted with first-year students have to date examined perceived available support, as opposed to actual received support, with one study having additionally explored the effects of social inclusion on health by assessing actual inclusion by peers (e.g., nominations of being "liked" by other students; Hartung et al. 2015). Further to actual support received, whereas the quality of social support is pertinent to understanding students' decisions to seek or accept certain types of support from varying sources, of the empirical research reviewed only two studies explicitly examined quality of support (Maymon et al. 2019; Mounts et al. 2006). Thus, despite Gottlieb and Bergen's (2010) recommendation that quantitative methods assessing how much support an individual receives should be complimented by qualitative methods assessing the quality of the support received, existing research with first-year students has yet to adequately employ either method to examine how frequency of support received may be differentiated from the quality of support received.

5. Discussion

Empirical research on first-year students' stress and social support provides evidence that social support represents a valuable coping mechanism for various types of stress experienced during the transition to higher education (e.g., academic, social, general). The present review identified contextual (e.g., social support), demographic (e.g., ethnic background), and psychological (e.g., perceptions of control) antecedents and correlates of stress, and highlighted how social support can function as a coping mechanism for first-year students. Whereas stress has been linked to poorer academic, motivational, social, physical, and emotional outcomes in first-year students, social support has been conversely associated with better adjustment in both quantitative and qualitative studies with students across disciplines (e.g., psychology, engineering, nursing) and countries (e.g., Canada, Germany, South Africa, United States). Methodologically speaking, although much of the research specific to students' experiences of stress in this review has been conducted using cross-sectional surveys, most of the reviewed studies relating to social support were longitudinal and primarily interventional in nature. The majority of studies reviewed on first-year students that have also examined both stress and social support have used self-report Likert-type measures; however, there have also been notable contributions to the field in the form of qualitative diaries and interviews.

In general, varying definitions of stress have led to a variety of measures being used to assess perceived stress in first-year students. Due to stress representing a general concept that can be examined as an antecedent, mediator, or outcome, this flexibility has contributed to inconsistencies in measurement, methodologies, and analyses throughout the stress literature and has been long recognized as a limitation of the extant literature (e.g., Lazarus and Folkman 1984). In relation to social support specifically, stress has been examined as both an antecedent (e.g., Pluut et al. 2015) and an outcome (e.g., Sy et al. 2011) as afforded by the reciprocal relationship between stress and coping, as well as changes over time in one's social environment (see Lazarus and Folkman 1984). However, relatively few studies have directly examined causal relationships between stress and social support in first-year students using longitudinal methods (cf. studies examining cross-lagged models of stress and self-reported achievement; Mackinnon 2012).

Additional methodological themes evident across the literature on first-year students' social support include a focus on perceptions of support availability rather than actual support received, following from the utilization of perceived social support measures (e.g., MSPSS; Dawson and Pooley 2013; Friedlander et al. 2007; Ruthig et al. 2009). Moreover, there appears to exist a common conception that *received* support represents a poorer predictor of outcomes compared with perceived *available* support; a belief that has contributed to infrequent use of received support measures in empirical research with first-year un-

dergraduates despite meta-analyses showing these constructs to similarly predict student adjustment (Haber et al. 2007).

Although received support is theoretically posited to be at least moderately correlated with perceived available support, with received supportive actions often assumed to inform one's perceptions of available support, empirical research has consistently provided little evidence of significant overlap between these variables (see Haber et al. 2007). One potential reason for this misalignment is that the argument for a strong relationship between received and perceived available support is based on the assumption that effects of received support are strongest when the type of support received matches support needs (Cohen and McKay 1984; Cutrona and Russell 1990; Lakey and Cohen 2000). As the majority of empirical studies have used the ISSB scale to measure received support with university students, it should be noted that this scale does not ask students if the support they received addressed their needs (quality of support) and instead only asks how often support was received (simply assuming that the support directly addressed one's needs).

Overall, further research is needed to examine the quality of support received by students to better examine the "fit" between supportive actions and recipients' needs. For example, results from Melrose et al. (2015) suggest that the relationship between received and perceived emotional support may depend largely on whether support was in fact needed. To further explore the mechanisms by which support may alleviate stress, research on the quality of social support with first-year students is warranted (see Maymon et al. 2019). The incorporation of support utility or needs matching in future research will prove to be critical in predicting better first-year student adjustment in addition to more typically assessed measures of perceived availability of support and coping strategies. Considering how first-year students have been found to respond differently depending on the source of support, future research is also encouraged to continue to explore interactions between social support variables on student adjustment outcomes depending on from whom the support is received (e.g., family, friends, institution). Finally, future reviews of literature on first-year student stress and social support could more closely examine intersections of demographic and background variables, and expand cultural, geographical, and language limitations for inclusion criteria.

Author Contributions: Conceptualization, R.M. and N.C.H.; methodology, R.M.; writing—original draft preparation, R.M.; writing—review and editing, N.C.H.; supervision, N.C.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Tables of Empirical Literature Reviewed

Table A1. Empirical Literature on Antecedents and Correlates of First-year Student Stress.

Type	Reference(s)	Sample	Approach	Main Findings
Contextual	Bojuwoye (2002)	Students from five universities in South Africa (N = 596)	Quantitative; Self-report questionnaire	• Financial difficulties, or lack of financial support, corresponded with the highest average rating of stress for students, as compared to variables involving the physical environmental, administration, academic demands, and personal/social factors (in descending order)
	Gibbons (2012)	BSc Psychology degree students in the U.K. (N = 120)	Quantitative; Self-report questionnaire	• Students' perception of social opportunities with peers (i.e., opportunities to interact with other students by participating in formal social events, clubs, societies, etc.) and university support (i.e., available facilities) as hassles positively corresponded with feelings of belonging • Hassles related to course delivery (i.e., learning materials and pedagogical strategies) corresponded with a lack feelings of belonging • Perceptions of social opportunities as hassles were negatively related to course satisfaction but positively related to intellectual motivation, which corresponded with supportive personal and family relationships perceived as positive motivators

Table A1. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
	Kennedy and Tuckman (2013)	Business majors in the U.S. (*N* = 671)	Quantitative; Longitudinal; Self-report questionnaires (two and eight weeks into the semester)	• A higher sense of school belonging was found to buffer against negative effects of perceived stress on first-semester GPA • School belonging mediated the positive effects of self-efficacy on GPA, whereas higher levels of procrastination predicted lower perceptions of school belonging and higher stress • Higher academic value and concerns over social exclusion predicted a stronger sense of school belonging, and reports of belonging were positively correlated with both mastery and performance goal orientations at T2
	Lester et al. (2010)	Occupational therapy students in the U.S. (*N* = 36)	Quantitative; Physiological data: saliva samples were taken four times over a semester	• Saliva samples showed significant changes in levels of stress hormones in relation to exams • Cortisol levels were highest immediately prior to students' first exam but decreased throughout the semester (i.e., prior to second and third exams)
	Maymon et al. (2019)	Students attending U.S. and Canadian higher education institutions (*N* = 126)	Quantitative; Self-report questionnaire	• Lower stress linked to higher quality support (i.e., support matching the needs of students) from faculty and/or staff
	Miczo et al. (2006)	Students from 2 universities in the U.S. (1 public, 1 private; *N* = 390)	Quantitative; Longitudinal; Self-report questionnaires (prior to/beginning of first semester and then mid-semester)	• Higher perceptions of received parental support at the beginning of students' first semester predicted lower stress later in the semester
Contextual	Petersen et al. (2009, 2010)	South African students receiving need-based financial aid (*N* = 194; same sample analyzed in both papers)	Quantitative; Self-report questionnaire	• General perceived stress was the strongest predictor (as compared with other variables such as intrinsic motivation, self-esteem, academic overload, etc.) of poorer psychological adjustment to college and performance • A follow-up study of these students (Petersen et al. 2010) found no significant relationships between stress during their first year and academic success three years later (% of courses required for a degree completed)
	Raffaelli et al. (2013)	College applicants to a public university in Mexico (*N* = 6715)	Quantitative; Self-report questionnaire	• Social support from family was found to buffer (correlations) against the negative effects of general perceived stress on depressive symptoms
	Sy et al. (2011)	First-generation female students in the U.S. (*N* = 339)	Quantitative; Self-report questionnaire	• Higher perceptions of parental emotional support correlated with lower overall stress levels
	Wilson and Pritchard (2005)	Varsity athletes and non-athletes in the U.S. (*N* = 362)	Quantitative; Self-report questionnaire	• Varsity athletes rated sources of stress differently compared to non-athletes • Athletes reported more stress due to conflicts with a significant other's family, having various responsibilities, not enough time for sleep, and heavy demands from extracurricular activities compared to non-athletes • Non-athletes reported more stress than athletes over financial burdens, making important decisions about education, paying too much for services, social conflicts with a roommate or friend over smoking, transportation, social isolation, being ignored, and dissatisfaction with physical appearance
	Wrench et al. (2013)	Health Sciences students in Australia (*N* = 132)	Qualitative; Open-ended questions completed online	• Students reported a lack of information on how to meet university expectations, due dates that were too close together, and inconsistencies between courses to contribute to greater stress levels

Table A1. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Demographic and achievement	*Selected examples:* Andersson et al. (2009); Bojuwoye (2002) *; Raffaelli et al. (2013) *; Rice et al. (2015) *	Multiple Andersson et al. (2009): Students from two Swedish Universities (N = 2032)	Multiple Andersson et al. (2009): Quantitative; Self-report questionnaire	• Females generally reported higher stress than males
	Amirkhan and Kofman (2018)	Students attending a major public U.S. university (N = 569). Follow-up survey sample drawn from same student population (N = 584)	Quantitative; Longitudinal; Self-report questionnaires (midway through first semester and six months later with grades collected at the end of each semester)	• Stress overload (measured as demand burden and lack of coping resources) significantly correlated with lower first-term GPA • Follow-up survey revealed second-term stress overload to correspond with lower second-term GPA and cumulative GPA that, in turn, predicted greater risk of attrition by the second year
	Bynum et al. (2007)	African American students in the U.S. (N = 247)	Quantitative; Self-report questionnaire	• Higher levels of stress significantly correlated with more racism experiences, as well as lower family income
	Filipkowski et al. (2016)	Ethnic minority students enrolled in introductory psychology courses in the U.S. (N = 216)	Quantitative; Longitudinal; Self-report questionnaires (beginning and end of first semester)	• Stress found to mediate the relationship between number of adverse life experiences (e.g., death of a loved one, major illness) and change in physical health symptoms (e.g., insomnia, indigestion) over the course of the first semester for ethnic minority students • More adverse life events predicted more stress that, in turn, predicted more physical health symptoms between the beginning and end of the semester
	Gallander Wintre et al. (2011)	Students from six universities in Canada (N = 600)	Quantitative; Longitudinal; Self-report questionnaires (August and November, with overall grades collected in March)	• Students who maintained their high school GPA during their first semester had significantly lower perceived stress than those with decreased GPAs (by at least one letter grade from high school to first semester) • Over 70% of the students showed a decrease in GPA in their first year relative to high school
	Gordon et al. (2020)	Low income/first-generation Latinx students in the U.S. (N = 274)	Longitudinal; Body Mass Index (BMI); Self-report surveys (first three weeks on campus, start of second quarter—10 weeks after T1, and end of school year)	• Perceived stress positively correlated with discrimination, poor sleep patterns, and symptoms of depression and anxiety
Psychological	Achtziger and Bayer (2013)	Science, humanities, and law/economics students in Germany (N = 165)	Quantitative; Self-report questionnaire	• Self-control mediated (correlations) the relationship between perfectionism and general perceived stress • Students with high academic standards reported higher self-control and lower perceived stress, but students who also reported feelings of performance dissatisfaction relevant to high academic standards reported lower self-control and higher stress
	Akgun and Ciarrochi (2003)	Students in Australia (N = 141)	Quantitative; Self-report questionnaire	• "Learned resourcefulness" (a composite measure of emotion regulation, problem solving, ability to delay gratification, and self-efficacy) found to moderate negative effects of academic stress on performance, with highly stressed first-year students who reported greater learned resourcefulness obtaining higher GPAs
	Amirkhan and Kofman (2018)	Students attending a public university in the U.S. (N = 569)	Quantitative; Self-report questionnaire	• Stress overload (measured as demand burden and lack of coping resources) significantly predicted lower first term GPA • A survey completed by the same cohort of students during their second semester revealed stress overload to similarly predict lower second term GPA, with GPA being the only significant predictor of attrition during their first year

Table A1. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Psychological	Ciarrochi and Scott (2006)	Psychology students in Australia (N = 163)	Quantitative; Longitudinal; Self-report surveys (collected during first year and again one year later)	• More effective problem solving predicted lower stress, with baseline stress significantly predicting stress levels one year later
	Heikkilä et al. (2011)	Students enrolled in faculties of law, arts, and agriculture in Finland (N = 437)	Quantitative; Self-report questionnaire	• Students exhibiting greater stress reported higher levels of learned helplessness (i.e., latent profiles across learning, regulation, cognitive, attributional variables)
	Palmer and Rodger (2009)	Students living in campus residences in Canada (N = 135)	Quantitative; Self-report questionnaire	• The use of avoidance coping, as well as emotion-focused coping, was associated with less overall stress in first-year students living in campus residences
	Rice et al. (2015)	Students in STEM programs from two public universities in the U.S. (N = 432)	Quantitative; Longitudinal; Self-report surveys (three times each during the first and second semesters for a total of six time points)	• Perfectionism has been found to moderate effects of academic stress on GPA for first-year students in STEM programs • Students who reported adaptive perfectionism experienced low to moderate stress and higher GPAs • Students who reported maladaptive perfectionism reported greater stress, and students with greater stress obtained lower GPAs, with increased stress over the year also linked to lower GPAs
	Ruthig et al. (2009)	Introductory psychology students in Canada (N = 288)	Quantitative; Longitudinal; Self-report surveys (September and March, with cumulative GPA collected in May)	• Perceived academic control at the beginning of the academic year partially mediated the beneficial effects of optimism and perceived available support measured at the beginning of the year on general stress at the end of the year
	Sarid et al. (2004)	Female nursing and physiotherapy students in Israel (N = 54)	Quantitative; Longitudinal; Physiological data and self-report questionnaires (saliva samples and questionnaires over four time-points: one month into first semester, during final exams, immediately following final exams, two weeks after receiving final exam grades)	• Students reported denial coping to moderate changes in immune system functioning during times of academic stress • Denial coping was found to buffer against changes in viral antibodies during exam periods
	Stupnisky et al. (2013)	Introductory psychology students in Canada (N = 779)	Quantitative; Longitudinal; Self-report surveys (October and March)	• High self-esteem in the first month of studies significantly corresponded with lower general perceived stress six months later
	Wrench et al. (2013)	Health Sciences students in Australia (N = 132)	Qualitative; Open-ended questions completed online	• Students expressed feelings of stress resulting from discrepancies between their expectations of academic workload/performance and actual work demands/performance

Table A2. Empirical Literature on First-year Student Social Support by Source.

Source	Reference	Sample	Approach	Main Findings
Peers	Friedlander et al. (2007)	Students in Canada (N = 115)	Quantitative; Longitudinal; Self-report questionnaires (November of first semester and 10 weeks later in second semester)	• Higher social, personal-emotional, and overall university adjustment, as well as lower depression levels, predicted by increases in social support from friends
	Hartung et al. (2015)	Psychology students in Germany (N = 75)	Quantitative; Self-report with data triangulation (students completed 10 bi-weekly ratings of perceived inclusion, health, and a ranking of their peers in which they indicated three students they most liked and three students they most disliked from a class roster)	• Perceptions of inclusion mediated positive effects of actual inclusion on health • Students' perception of social inclusion was predicted by actual inclusion (rated by peers), with those who received higher ratings of liking by peers having higher perceptions of inclusion • Perceived inclusion predicted better self-rated health and mediated the beneficial effects of actual inclusion on health
	Mattanah et al. (2012)	Students in the U.S. (N = 88)	Quantitative; Longitudinal; Self-report surveys (three times over the course of the intervention) *Intervention Program:* Students met with peers over nine weeks for discussions facilitated by advanced psychology students (topics related to social relationships, academics, expectations, values, and campus resources).	• Participation in the social support intervention predicted lower levels of loneliness in students' second semester and higher GPAs in the fall of their second year • While higher perceptions of loneliness significantly predicted lower GPA, loneliness was not found to be a significant contributor to the effect of support program participation on GPA in follow-up mediation analyses
	Pluut et al. (2015)	Students in an organizational behaviour course in the Netherlands (N = 155)	Quantitative; Longitudinal; Self-report questionnaires (three questionnaires over a three week period)	• Students who perceived stronger social support from their in-class study groups reported higher academic satisfaction • More study-related stressors predicted more study-to-leisure conflict and lower academic performance, and higher leisure-to-study conflict predicted lower academic satisfaction and performance
	Thompson (2008)	Students in the U.S. (N = 32)	Qualitative; Diary entries describing academically supportive interactions experienced each day for a week (including source of support, location, and method of communication), and interviews to clarify entries with more than half of the sample	• Students reported receiving more support from peers than faculty • 37% of students reported themselves as initiating academic support interactions, 34% reported social support interactions initiated by other students, and 29% reported mutual initiation
	Continued Thompson (2008)			• 69% of interactions were reported as unplanned, and occurring most frequently in student dorms or living quarters (42%) at night or on weekends • Most interactions reported in diary entries were face-to-face (83%) with interviews revealing an additional integration of computer mediated social interactions (e.g., e-mail, Facebook)

Table A2. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Family	Miczo et al. (2006)	Students from two universities in the U.S. (N = 390)	Quantitative; Longitudinal; Self-report surveys (September and October/November)	• Parental support was linked to students' attitudes and responses toward illness • Higher received parental support at the beginning of the semester predicted lower stress at the end of the semester • Higher received support from parents was linked to increased tendencies to seek medical attention when sick and a decreased tendency to deny illness symptoms; higher desired support was associated with an increased tendency to deny symptoms
	Mounts (2004)	Introductory psychology students in the U.S. (N = 319)	Quantitative; Self-report questionnaire	• More perceived parental support was associated with lower levels of depression and loneliness • A greater sense of school belonging was found to be significant when analysed as a mediator between parental support and well-being, such that more belonging predicted less depression and loneliness
	Mounts et al. (2006)	Students in the U.S. (N = 350)	Quantitative; Self-report questionnaire	• Low levels of shyness, high perceived parental support, and high sociability associated with fewer reports of loneliness • Parental support linked to higher quality friendships and lower levels of depression • Greater levels of loneliness linked with higher levels of depression and anxiety, with interaction effects showing low sociability and high shyness, as well as high sociability and low parental support, to correspond with higher anxiety specifically for African American students
Faculty	Longwell-Grice and Longwell-Grice (2008)	Working-class male students in the U.S. (N = 4)	Qualitative; Case studies	• Students reported hesitation in seeking faculty support. Reasons included perceptions that faculty do not care or do not want to be bothered
Institution	Walton and Cohen (2011)	Students in the U.S. (N = 92)	Quantitative; Longitudinal; Self-report surveys (daily surveys for a week and a follow up survey three years later) *Intervention Program:* second semester students received narratives portraying experiences of social adversity as common and temporary. Students wrote an essay on similar personal experiences and read it aloud on camera for future students.	• African American students' sense of school belonging found to buffer against negative effects of adversity on GPA following from participation in the intervention program • Both European American and African American intervention participants obtained higher GPAs at the end of their senior year than respective control groups • African American students from the intervention group reported better health and fewer doctor visits at the end of their senior year than their peers in the control group
	Walton et al. (2015)	Engineering students in Canada (N = 228)	Quantitative; Longitudinal; Self-report surveys (surveys completed every other day for 12 days, a pre-intervention survey, and a post-intervention survey 4 months later) *Intervention Program:* An intervention similar to Walton and Cohen (2011) with narratives aimed at reducing feelings of adversity, with additional statements specific to gender equality regarding first-year transition experiences (e.g., both male and female students worried about being treated with respect)	• The intervention predicted higher GPAs • At the end of their first year, women who participated in the intervention had significantly higher GPAs, attributed less importance to negative events, and reported higher self-esteem over the 12 days following the intervention compared to women in the control condition • Women in the intervention group reported more friendships with male engineers and less of a decline in perceptions of women's value in engineering as compared to controls

Table A2. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Multiple sources of support	Brouwer et al. (2016)	Social sciences students in the Netherlands (N = 407)	Quantitative; Longitudinal; Self-report surveys (September of first semester and January of second semester)	• Support from peers (help/advice seeking) and collaboration predicted having more friends that, in turn, predicted higher grades • Higher ratings of mentorship support by faculty predicted higher self-efficacy that, in turn, predicted higher grades • Significant effects of first semester peer and faculty support on first-semester grades but not second semester grades
	Chang et al. (2014)	Underrepresented racial minority STEM students in the U.S. (N = 1634)	Quantitative; Longitudinal; Self-report surveys (Beginning of first semester and January of second semester)	• Participation in research support programs (e.g., with employment opportunities) predicted greater persistence in STEM for underrepresented racial minority students over four years • Belonging to a major-related club or organization and frequent studying with peers positively influenced STEM persistence, though to a lesser extent than participation in a research program
	Cornelius et al. (2016)	Students in Australia (initial pilot study N = 32, follow-up study N = 132)	Mixed methods: qualitative and quantitative; Phone and face-to-face interviews with closed- and open-ended questions *Intervention Program:* The First STEP (Striving Toward Excellence Program) initiative encouraged students to meet with academic and peer mentors at least three times during their first semester. This formal peer and faculty mentorship program placed students into groups of five, with each group receiving an academic and a peer mentor, and included a matching process and training/orientation.	• Mean scores on survey responses indicated positive experiences in the program with a thematic content analysis of open-ended responses showing (1) students liked their level of involvement in the matching process; (2) topics of discussion centred around career, personal issues, and study; (3) mentor relationships were "helpful" and students felt they developed "strong relationships"; (4) main benefits of meeting people, transitioning to a new environment, better understanding of the university, and learning how to study
	Dawson and Pooley (2013)	Students in Australia (N = 103)	Quantitative; Longitudinal; Self-report surveys (first and second semester)	• Perceived social support from family, significant others, and friends (one general measure) was positively associated with resilience beyond effects of perceived parental autonomy
	Espinosa (2011)	Female racial minority students in STEM programs across 135 institutions in the U.S. (N = 1250)	Quantitative; Longitudinal; Self-report surveys (entry to higher education and Spring semester of fourth year)	• Discussing course content with peers, joining STEM-related student organizations, research experiences, and the presence of a robust STEM community at the university predicted greater persistence over four years
	Hausmann et al. (2007)	Students at a large, public U.S. university (N = 365)	Quantitative; Longitudinal; Self-report surveys (first and second semester) *Intervention Program:* The enhanced school belonging intervention group received several letters from university administrators emphasizing students' value to the school community and small gifts bearing the university's logo (e.g., ID holders, magnets)	• The intervention group exhibited less of a decline in sense of belonging over time compared to controls • Greater sense of belonging at the beginning of the academic year corresponded with more frequent interactions with supportive peers, faculty, and parents • Higher levels of belongingness corresponded with greater student persistence • Increasing parental support corresponded to increased intentions to persist throughout the academic year • Students reported increased interactions with faculty members over time

Table A2. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Multiple sources of support	Lucas and Robinson (2002)	Education students in the U.S. (N = 36)	Mixed methods: qualitative (surveys, interviews) and quantitative (surveys, enrolment data) *Intervention Program:* Students registered in the same sections of 3 courses and were paired with faculty mentors (arts and sciences), having 2–3 meetings with faculty mentors and at least 1 meeting with the university's Teacher Education Advocacy Center	• Students reported positive effects of a sense of community as a consequence of the emotional and academic peer and faculty support embedded in the intervention
	Maymon et al. (2019)	Students attending U.S. and Canadian higher education institutions (N = 126)	Quantitative; Self-report questionnaire	• High-quality faculty/staff support correlated with lower stress, burnout, and quitting intentions, and greater feelings of belonging and life satisfaction • Greater institutional support (e.g., workshops, formal support services) corresponded to lower burnout and quitting intentions • Greater family support linked to higher life satisfaction • Greater friend support associated with lower levels of loneliness
	McGonagle et al. (2014)	Students in the U.S. (N = 59)	Quantitative; Longitudinal; Self-report surveys (first year program and once again two years later) *Intervention Program:* The Science Technology Reaching Out to New Generations in Connecticut (STRONG-CT) program provided academic, social, and financial support to students via academic advising, individual tutoring, research opportunities, mentorship in STEM fields, professional development workshops, community directed enrichment courses, and book stipends	• Compared to controls, students who participated in the STRONG-CT program reported spending more hours per week studying, fewer stressors, and higher academic self-efficacy • Interaction effects showed that the intervention buffered against a decline in academic self-efficacy and an increase in stressors • Initial differences showed students in the STRONG-CT group already had higher academic self-efficacy and spent more hours studying per week before the intervention, with no significant intervention effects observed on final-year GPA
	Nicpon et al. (2006)	Students in the U.S. (N = 401)	Quantitative; Self-report survey	• More social support and lower levels of loneliness were linked to greater persistence, but not to GPA • Students living on-campus had higher GPAs than those living off-campus • Females had higher perceptions of social support from family and friends compared to males
	Pancer et al. (2004)	Students in Canada (N = 110)	Mixed methods: qualitative and quantitative; Longitudinal; Self-report surveys with open-ended questions (prior to and twice during first year, once in fourth year) *Intervention Program:* Students in the intervention group met weekly with peers in small groups throughout their first semester	• The intervention group reported more positive university experiences in their responses to open-ended questions compared to students in a control group • Students in the intervention group experienced better adjustment throughout their studies compared to the control group • Students in the intervention group had a lower rate of university withdrawal compared to controls (7.8% vs. 28%)

Table A2. *Cont.*

Type	Reference(s)	Sample	Approach	Main Findings
Multiple sources of support	Purswell et al. (2008)	Students in the U.S. (N = 329)	Quantitative; Longitudinal; Self-report surveys (first and second year)	• Higher parental support correlated with stronger learning intentions for students despite parental education levels, with more engagement in learning behaviours reported by students whose parent(s) had at least some college experience • For students whose parent(s) had at least some college experience, and students whose parent(s) obtained college degrees, peer support, parental support, and learning intentions were positively intercorrelated • More parental support predicted more engagement for students whose parent(s) obtained degrees, and more peer support to predict more engagement for students whose parent(s) had less college experience
	Ricks et al. (2014)	Engineering students in the U.S. (N = 34) Program participation required specific standards of GPA, American College Test (ACT) scores, and financial need	Mixed methods: qualitative (surveys, interviews, record reviews) and quantitative (retention / graduation) *Intervention Program:* Students who participated in the learning community attended the cohort courses, received scholarships and academic support in math, and were provided study space, faculty advisors, and weekly study sessions	• Qualitative assessments identified peer study groups, mentoring, and tutoring to be important aspects contributing to persistence and academic success for first-year students in an engineering program • Retention and graduation rates for the learning community participants were higher in comparison to other students in similar programs at the same institution
	Sevinç and Gizir (2014)	Students experiencing adjustment difficulties 6 months into their program in Turkey (N = 25)	Qualitative; Interviews	• Students described a lack of support from their faculties and peers • Limited participation in recreational activities and the pursuit of individual instead of group activities during leisure time were found to negatively influence social adjustment • Both individual factors (e.g., loneliness) and institutional factors (e.g., sense of university belonging) were identified as themes in students' overall adjustment to the first-year transition
	Toews and Yazedjian (2007)	Students in the U.S. (N = 883)	Quantitative; Self-report survey	• High parental and peer support corresponded with better academic adjustment for Caucasian males and females • Only peer support was significantly correlated with better adjustment for Hispanic females

* Sample and Approach described elsewhere in Table A1.

References

Achtziger, Anja, and Ute C. Bayer. 2013. Self-control mediates the link between perfectionism and stress. *Motivation and Emotion* 37: 413–23. [CrossRef]

Akgun, Serap, and Joseph Ciarrochi. 2003. Learned resourcefulness moderates the relationship between academic stress and academic performance. *Educational Psychology* 23: 287–94. [CrossRef]

Amirkhan, James H., and Yasmin B. Kofman. 2018. Stress overload as a red flag for freshman failure and attrition. *Contemporary Educational Psychology* 54: 297–308. [CrossRef]

Andersson, Claes, Kent O. Johnsson, Mats Berglund, and Agneta Öjehagen. 2009. Measurement properties of the Arnetz and Hasson stress questionnaire in Swedish university freshmen. *Scandinavian Journal of Public Health* 37: 273–79. [CrossRef] [PubMed]

Antony, Martin M., P. J. Bieling, B. J. Cox, Murray W. Enns, and R. P. Swinson. 1998. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment* 10: 176–81. [CrossRef]

Arnett, Jeffrey. 2000. Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist* 55: 469–80. [CrossRef]

Ben-Sira, Z. 1979. A scale of psychological distress. *Research Communications in Psychology, Psychiatry and Behavior* 4: 337–56.

Bojuwoye, Olaniyi. 2002. Stressful experiences of first year students of selected universities in South Africa. *Counselling Psychology Quarterly* 15: 277–90. [CrossRef]

Brouwer, Jasperina, Ellen Jansen, Andreas Flache, and Adriaan Hofman. 2016. The impact of social capital on self-efficacy and study success among first-year university students. *Learning and Individual Differences* 52: 109–18. [CrossRef]

Bynum, Mia S., E. Thomaseo Burton, and C. Best. 2007. Racism experiences and psychological functioning in African American college freshmen: Is racial socialization a buffer? *Cultural Diversity & Ethnic Minority Psychology* 13: 64–71. [CrossRef]

Chang, Mitchell J., Jessica Sharkness, Sylvia Hurtado, and Christopher B. Newman. 2014. What matters in college for retaining aspiring scientists and engineers from underrepresented racial groups. *Journal of Research in Science Teaching* 51: 555–80. [CrossRef]
Ciarrochi, Joseph, and Greg Scott. 2006. The link between emotional competence and well-being: A longitudinal study. *British Journal of Guidance & Counselling* 34: 231–43. [CrossRef]
Ciarrochi, Joseph, Terri Said, and Frank P. Deane. 2005. When simplifying life is not so bad: The link between rigidity, stressful life events, and mental health in an undergraduate population. *British Journal of Guidance & Counselling* 33: 185–97. [CrossRef]
Cohen, Sheldon, and Garth McKay. 1984. Social support, stress and the buffering hypothesis: A theoretical analysis. In *Handbook of Psychology and Health*. Edited by Andrew Baum, Shelley E. Taylor and Jerome E. Singer. Hillsdale: Erlbaum, vol. 4, pp. 253–67.
Cohen, Sheldon, Tom Kamarck, and Robin Mermelstein. 1983. A global measure of perceived stress. *Journal of Health and Social Behavior* 24: 385–96. [CrossRef]
Compas, Bruce E., Jennifer K. Connor-Smith, Heidi Saltzman, Alexandria Harding Thomsen, and Martha E. Wadsworth. 2001. Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin* 127: 87–127. [CrossRef]
Connor-Smith, Jennifer K., and Bruce E. Compas. 2002. Vulnerability to social stress: Coping as a mediator or moderator of sociotropy and symptoms of anxiety and depression. *Cognitive Therapy and Research* 26: 39–55. [CrossRef]
Cook, Lindsey. 2014. Is the college admissions bubble about to burst? Getting into the right college is more stressful and competitive than ever before. *U.S. News*, September 22. Available online: https://www.usnews.com/news/blogs/data-mine/2014/09/22/is-the-college-admissions-bubble-about-to-burst (accessed on 7 December 2021).
Cornelius, Vanessa, Leigh Wood, and Jennifer Lai. 2016. Implementation and evaluation of a formal academic-peer-mentoring programme in higher education. *Active Learning in Higher Education* 17: 193–205. [CrossRef]
Coughlan, Sean. 2015. Rising numbers of stressed students seek help. *BBC News*. September 30. Available online: https://www.bbc.com/news/education-34354405 (accessed on 7 December 2021).
Crandall, Christian S., Jeanne J. Preisler, and Julie Aussprung. 1992. Measuring life event stress in the lives of college students: The Undergraduate Stress Questionnaire (USQ). *Journal of Behavioral Medicine* 15: 627–62. [CrossRef]
Cutrona, Carolyn E. 1984. Social support and stress in the transition to parenthood. *Journal of Abnormal Psychology* 93: 378–90. [CrossRef]
Cutrona, Carolyn E., and Daniel W. Russell. 1987. The provisions of social relationships and adaptation to stress. *Advances in Personal Relationships* 1: 37–67.
Cutrona, Carolyn E., and Daniel W. Russell. 1990. Type of social support and specific stress: Toward a theory of optimal matching. In *Social Support: An Interactional View*. Edited by Barbara R. Sarason, Irwin G. Sarason and Gregory R. Pierce. New York: Wiley, pp. 319–66.
Dawson, Michelle, and Julie Ann Pooley. 2013. Resilience: The role of optimism, perceived parental autonomy support and perceived social support in first year university students. *Journal of Education and Training Studies* 1: 38–49. [CrossRef]
Denovan, Andrew, and Ann Macaskill. 2013. An interpretative phenomenological analysis of stress and coping in first year undergraduates. *British Educational Research Journal* 39: 1002–24. [CrossRef]
Derogatis, L. R. 1993. *Brief Symptom Inventory (BSI): Administration, Scoring, and Procedures Manual*, 3rd ed. Minneapolis: National Computer Systems.
Dixon Rayle, Andrea, and Kuo-Yi Chung. 2007. Revisiting first-year college students' mattering: Social support, academic stress, and the mattering experience. *Journal of College Student Retention* 9: 21–37. [CrossRef]
Dyson, Rachael, and Kimberly Renk. 2006. Freshmen adaptation to university life: Depressive symptoms, stress, and coping. *Journal of Clinical Psychology* 62: 1231–44. [CrossRef] [PubMed]
Earnest, David R., and William O. Dwyer. 2010. In their own words: An online strategy for increasing stress-coping skills among college freshmen. *College Student Journal* 44: 888–900.
Espinosa, Lorelle. 2011. Pipelines and pathways: Women of color in undergraduate STEM majors and the college experiences that contribute to persistence. *Harvard Educational Review* 81: 209–41. [CrossRef]
Federal Interagency Forum on Child and Family Statistics (FIFCFS). 2014. *America's Young Adults: Special Issue*. Washington, DC: U.S. Government Printing Office.
Filipkowski, Kelly B., Kristin E. Heron, and Joshua M. Smyth. 2016. Early adverse experiences and health: The transition to college. *American Journal of Health Behavior* 40: 717–28. [CrossRef]
Friedlander, Laura J., Graham J. Reid, Naomi Shupak, and Robert Cribbie. 2007. Social support, self-esteem, and stress as predictors of adjustment to university among first-year undergraduates. *Journal of College Student Development* 48: 259–74. [CrossRef]
Gale, Trevor, and Stephen Parker. 2014. Navigating change: A typology of student transition in higher education. *Studies in Higher Education* 39: 734–53. [CrossRef]
Gallander Wintre, Maxine, Barry Dilouya, S. Mark Pancer, Michael W. Pratt, Shelly Birnie-Lefcovitch, Janet Polivy, and Gerald Adams. 2011. Academic achievement in first-year university: Who maintains their high school average? *Higher Education* 62: 467–81. [CrossRef]
Garett, Renee, Sam Liu, and Sean D. Young. 2017. A longitudinal analysis of stress among incoming college freshmen. *Journal of American College Health* 65: 331–38. [CrossRef] [PubMed]
Gibbons, Chris. 2012. Stress, positive psychology and the National Student Survey. *Psychology Teaching Review* 18: 22–30.

Goodenow, Carol. 1993. The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychology in the Schools* 30: 79–90. [CrossRef]
Gordon, Amie M., Aric A. Prather, Tessa Dover, Kathy Espino-Pérez, Payton Small, and Brenda Major. 2020. Anticipated and experienced ethnic/racial discrimination and sleep: A longitudinal study. *Personality and Social Psychology Bulletin* 46: 1724–35. [CrossRef]
Gottlieb, Benjamin H., and Anne E. Bergen. 2010. Social support concepts and measures. *Journal of Psychosomatic Research* 69: 511–20. [CrossRef]
Haber, Mason G., Jay L. Cohen, Todd Lucas, and Boris B. Baltes. 2007. The relationship between self-reported received and perceived social support: A meta-analytic review. *American Journal of Community Psychology* 39: 133–44. [CrossRef]
Hartung, Freda-Marie, Gudrun Sproesser, and Britta Renner. 2015. Being and feeling liked by others: How social inclusion impacts health. *Psychology & Health* 30: 1103–15. [CrossRef]
Hausmann, Leslie R. M., Janet Ward Schofield, and Rochelle L. Woods. 2007. Sense of belonging as a predictor of intentions to persist among African American and White first-year college students. *Research in Higher Education* 48: 803–39. [CrossRef]
Heikkilä, Annamari, Markku Niemivirta, Juha Nieminen, and Kirsti Lonka. 2011. Interrelations among university students' approaches to learning, regulation of learning, and cognitive and attributional strategies: A person oriented approach. *Higher Education* 61: 513–29. [CrossRef]
Hoyt, Lindsay Till, Alison K. Cohen, Brandon Dull, Elena Maker Castro, and Neshat Yazdani. 2021. "Constant stress has become the new normal": Stress and anxiety inequalities among US College students in the time of covid-19. *Journal of Adolescent Health* 68: 270–76. [CrossRef] [PubMed]
Kennedy, Gary J., and Bruce W. Tuckman. 2013. An exploration into the influence of academic and social values, procrastination, and perceived school belongingness on academic performance. *Social Psychology of Education* 16: 435–70. [CrossRef]
Kennedy, Tom. 2013. Campus crisis: Why are suicide rates rising among university students? *CTV News*, September 20; pp. 1–2. Available online: http://www.ctvnews.ca/w5/campus-crisis-why-are-suicide-rates-rising-among-university-students-1.1463654 (accessed on 7 December 2021).
Kenny, Maureen E. 1987. The extent and function of parental attachment among first-year college students. *Journal of Youth and Adolescence* 16: 17–29. [CrossRef]
Kohn, Paul M., Kathryn Lafreniere, and Maria Gurevich. 1990. The inventory of college students' recent life experiences: A decontaminated hassles scale for a special population. *Journal of Behavioral Medicine* 13: 619–30. [CrossRef]
Krieg, Dana. 2013. High expectations for higher education? Perceptions of college and experiences of stress prior to and through the college career. *College Student Journal* 47: 635–43. Available online: https://www.ingentaconnect.com/content/prin/csj/2013/00000047/00000004/art00008 (accessed on 7 December 2021).
Krypel, Michelle N., and Donna Henderson-King. 2010. Stress, coping styles, and optimism: Are they related to meaning of education in students' lives? *Social Psychology of Education* 13: 409–24. [CrossRef]
Lakey, Brian, and Sheldon Cohen. 2000. Social support theory and measurement. In *Social Support Measurement and Intervention: A Guide for Health and Social Scientists*. Edited by Sheldon Cohen, Lynn G. Underwood and Benjamin H. Gottlieb. New York: Oxford University Press, pp. 29–52.
Largo-Wight, Erin, P. Michael Peterson, and W. William Chen. 2005. Perceived problem solving, stress, and health among college students. *American Journal of Health Behavior* 29: 360–70. [CrossRef]
Lazarus, Richard. S. 2000. Evolution of a model of stress, coping, and discrete emotions. In *Handbook of Stress, Coping, and Health: Implications for Nursing Research, Theory, and Practice*. Edited by Virginia Hill Rice. Thousand Oaks: Sage Publications, pp. 195–222.
Lazarus, Richard S., and Susan Folkman. 1984. *Stress, Appraisal, and Coping*. New York: Springer Publishing Company, Inc.
LePine, Jeff A., Marcie A. LePine, and Christine L. Jackson. 2004. Challenge and hindrance stress: Relationships with exhaustion, motivation to learn, and learning performance. *Journal of Applied Psychology* 89: 883–91. [CrossRef]
Lester, S. Reid, Jason R. Brown, Jeffrey E. Aycock, S. Lee Grubbs, and Roger B. Johnson. 2010. Use of saliva for assessment of stress and its effect on the immune system prior to gross anatomy practical examinations. *Anatomical Sciences Education* 3: 160–67. [CrossRef] [PubMed]
Li, Susan Tinsley, Arielle Berman Albert, and Deborah G. Dwelle. 2014. Parental and peer support as predictors of depression and self-esteem among college students. *Journal of College Student Development* 55: 120–38. [CrossRef]
Longwell-Grice, Rob, and Hope Longwell-Grice. 2008. Testing Tinto: How do retention theories work for first-generation, working-class students? *Journal of College Student Retention* 9: 407–20. [CrossRef]
Lovibond, P. F., and S. H. Lovibond. 1995. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy* 33: 335–43. [CrossRef]
Lucas, Tamara, and Jennifer Robinson. 2002. Promoting the retention of prospective teachers through a cohort for college freshman. *The High School Journal* 86: 3–14. Available online: https://www.jstor.org/stable/40364341 (accessed on 7 December 2021). [CrossRef]
Lunau, Kate. 2012. The Mental Health Crisis on Campus. *Macleans*, 1–7. Available online: http://www.macleans.ca/education/uniandcollege/the-mental-health-crisis-on-campus/ (accessed on 7 December 2021).
MacDonald, Gayle. 2017. For some students, the transition to university can be hard on mental health. *The Globe and Mail*, August 16. Available online: https://www.theglobeandmail.com/life/parenting/back-to-school/the-transition-to-university-can-be-hard-on-mental-health/article36003286/ (accessed on 7 December 2021).

Mackinnon, Sean P. 2012. Perceived social support and academic achievement: Cross-lagged panel and bivariate growth curve analyses. *Journal of Youth and Adolescence* 41: 474–85. [CrossRef] [PubMed]
Mattanah, Jonathan F., Leonie J. Brooks, Bethany L. Brand, Julie L. Quimby, and Jean F. Ayers. 2012. A social support intervention and academic achievement in college: Does perceived loneliness mediate the relationship? *Journal of College Counseling* 15: 22–36. [CrossRef]
Maymon, Rebecca, Nathan C. Hall, and Jason M. Harley. 2019. Supporting first-year students during the transition to higher education: The importance of quality and source of received support for student well-being. *Student Success* 10: 64–75. [CrossRef]
McGonagle, McGonagle, Hedley Freake, Steven Zinn, Timothy Bauerle, Jeffrey Winston, Gary Lewicki, Marcia Jehnings, Diba Khan-Bureau, and Melissa Philion. 2014. Evaluation of STRONG-CT: A program supporting minority and first-generation U.S. science students. *Journal of STEM Education* 15. Available online: https://www.learntechlib.org/p/148290/ (accessed on 7 December 2021).
McKinley, Christopher. 2013. Applying a distress-deterring approach to examine how emotional support predicts perceived stress and stress-related coping response. *Southern Communication Journal* 78: 387–404. [CrossRef]
Melrose, Karen L., Gordon D. A. Brown, and Alex M. Wood. 2015. When is received social support related to perceived support and well-being? When it is needed. *Personality and Individual Differences* 77: 97–105. [CrossRef]
Mendelson, Morton J., and Frances E. Aboud. 1999. Measuring friendship quality in late adolescents and young adults: McGill Friendship Questionnaires. *Canadian Journal of Behavioural Science/Revue Canadienne des Sciences du Comportement* 31: 130–32. [CrossRef]
Meyer, John P., Natalie J. Allen, and Catherine A. Smith. 1993. Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology* 78: 538–51. [CrossRef]
Miczo, Nathan, Lisa A. Miczo, and Michelle Johnson. 2006. Parental support, perceived stress, and illness-related variables among first-year college students. *The Journal of Family Communication* 6: 97–117. [CrossRef]
Molloy, Fran. 2016. University burnout: It's a thing for stressed-out students. *The Sydney Morning Herald*, January 14. Available online: https://www.smh.com.au/national/university-burnout-its-a-thing-for-stressedout-students-20160113-gm5ddg.html (accessed on 7 December 2021).
Mortier, Philippe, Randy P. Auerbach, Jordi Alons, Jason Bantjes, Corina Benjet, Pim Cuijper, David D. Ebert, Jennifer Greif Green, Penelope Hasking, Matthew K. Nock, and et al. 2018. Suicidal thoughts and behaviors among first-year college students: Results from the WMH-ICS Project. *Journal of the American Academy of Child & Adolescent Psychiatry* 57: 263–73. [CrossRef]
Mounts, Nina S. 2004. Contributions of parenting and campus climate to freshmen adjustment in a multiethnic sample. *Journal of Adolescent Research* 19: 468–91. [CrossRef]
Mounts, Nina S., David P. Valentiner, Katherine L. Anderson, and Michelle K. Boswell. 2006. Shyness, sociability, and parental support for the college transition: Relation to adolescents' adjustment. *Journal of Youth and Adolescence* 35: 68–77. [CrossRef]
Nicpon, Megan Foley, Laura Huser, Elva Hull Blanks, Sonja Sollenberger, Christie Befort, and Sharon E. Robinson Kurpius. 2006. The relationship of loneliness and social support with college freshmen's academic performance and persistence. *Journal of College Student Retention* 8: 345–58. [CrossRef]
O'Hare, Thomas, and Margaret V. Sherrer. 2006. Stress, recent changes in alcohol consumption level, and problem drinking in freshman first offenders. *Journal of Human Behavior in the Social Environment* 13: 33–50. [CrossRef]
OECD. 2018. [Graduation Rate (Indicator)]. Available online: https://data.oecd.org/eduatt/graduation-rate.htm (accessed on 13 November 2018).
Örücü, Müge Çelik, and Ayhan Demir. 2009. Psychometric evaluation of perceived stress scale for Turkish university students. *Stress and Health* 25: 103–9. [CrossRef]
Palmer, Angèle, and Susan Rodger. 2009. Mindfulness, stress, and coping among university students. *Canadian Journal of Counselling and Psychotherapy/Revue Canadienne de Counseling et de Psychothérapie* 43: 198–212. Available online: https://cjc-rcc.ucalgary.ca/article/view/59019 (accessed on 7 December 2021).
Pancer, S. Mark, Michael Pratt, Bruce Hunsberger, and Susan Alisat. 2004. Bridging troubled waters: Helping students make the transition from high school to university. *Guidance & Counselling* 19: 184–90.
Petersen, Il-haam, Johann Louw, and Kitty Dumont. 2009. Adjustment to university and academic performance among disadvantaged students in South Africa. *Educational Psychology* 29: 99–115. [CrossRef]
Petersen, Il-haam, Johann Louw, Kitty Dumont, and Nomxolisi Malope. 2010. Adjustment to university and academic performance: Brief report of a follow-up study. *Educational Psychology* 30: 369–75. [CrossRef]
Pluut, Helen, Petru Lucian Curşeu, and Remus Ilies. 2015. Social and study related stressors and resources among university entrants: Effects on well-being and academic performance. *Learning and Individual Differences* 37: 262–68. [CrossRef]
Procidano, Mary E., and Kenneth Heller. 1983. Measures of perceived social support from friends and from family: Three validation studies. *American Journal of Community Psychology* 11: 1–24. [CrossRef] [PubMed]
Purswell, Katherine E., Ani Yazedjian, and Michelle L. Toews. 2008. Students' intentions and social support as predictors of self-reported academic behaviors: A comparison of first-and continuing-generation college students. *Journal of College Student Retention* 10: 191–206. [CrossRef]

Raffaelli, Marcela, Flavia C. D. Andrade, Angela R. Wiley, Omar Sanchez-Armass, Laura L. Edwards, and Celia Aradillas-Garcia. 2013. Stress, social support, and depression: A test of the stress-buffering hypothesis in a Mexican sample. *Journal of Research on Adolescence* 23: 283–89. [CrossRef]

Rice, Kenneth G., Merideth E. Ray, Don E. Davis, Cirleen DeBlaere, and Jeffrey S. Ashby. 2015. Perfectionism and longitudinal patterns of stress for STEM majors: Implications for academic performance. *Journal of Counseling Psychology* 62: 718–31. [CrossRef]

Ricks, Kenneth G., James A. Richardson, Harold P. Stern, Robert P. Taylor, and Ryan A. Taylor. 2014. An engineering learning community to promote retention and graduation of at-risk engineering students. *American Journal of Engineering Education* 5: 73–90. [CrossRef]

Robotham, David. 2008. Stress among higher education students: Towards a research agenda. *Higher Education* 56: 735–46. [CrossRef]

Rocha-Singh, Indra A. 1994. Perceived stress among graduate students: Development and validation of the Graduate Stress Inventory. *Educational and Psychological Measurement* 54: 714–27. [CrossRef]

Mirowsky, John, and Catherine E. Ross. 2017. *Social Causes of Psychological Distress*. Hawthorne: Routledge. [CrossRef]

Ruthig, Joelle C., Tara L. Haynes, Robert H. Stupnisky, and Raymond P. Perry. 2009. Perceived academic control: Mediating the effects of optimism and social support on college students' psychological health. *Social Psychology of Education* 12: 233–49. [CrossRef]

Rutledge, Patricia C., and Kenneth J. Sher. 2001. Heavy drinking from the freshman year into early young adulthood: The roles of stress, tension-reduction drinking motives, gender and personality. *Journal of Studies on Alcohol* 62: 457–66. [CrossRef] [PubMed]

Saldaina, Delia H. 1994. Acculturative stress: Minority status and distress. *Hispanic Journal of Behavioral Sciences* 16: 116–28. [CrossRef]

Sarason, Irwin G., James H. Johnson, and Judith M. Siegel. 1978. Assessing the impact of life changes: Development of the Life Experiences Survey. *Journal of Consulting and Clinical Psychology* 46: 932–46. [CrossRef] [PubMed]

Sarid, Orly, Ofra Anson, A. Yaari, and M. Margalith. 2004. Coping styles and changes in humoural reaction during academic stress. *Psychology, Health & Medicine* 9: 85–98. [CrossRef]

Selye, Hans. 1976. *The Stress of Life*. (Revised ed.). New York: McGrawHill Book Co.

Sevinç, Seda, and Cem Ali Gizir. 2014. Factors negatively affecting university adjustment from the views of first-year university students: The case of Mersin University. *Educational Sciences: Theory & Practice* 14: 1301–8. [CrossRef]

Simons, Jeffrey S., and Raluca M. Gaher. 2005. The Distress Tolerance Scale: Development and validation of a self-report measure. *Motivation and Emotion* 29: 83–102. [CrossRef]

Skinner, Ellen A., and Melanie J. Zimmer-Gembeck. 2007. The development of coping. *Annual Review of Psychology* 58: 119–44. [CrossRef]

Stoliker, Bryce E., and Kathryn D. Lafreniere. 2015. The influence of perceived stress, loneliness, and learning burnout on university students' educational experience. *College Student Journal* 49: 146–60.

Stupnisky, Robert H., Raymond P. Perry, Robert D. Renaud, and Steve Hladkyj. 2013. Looking beyond grades: Comparing self-esteem and perceived academic control as predictors of first-year college students' well-being. *Learning and Individual Differences* 23: 151–57. [CrossRef]

Suls, Jerry, and Barbara Fletcher. 1985. The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis. *Health Psychology* 4: 249–88. [CrossRef] [PubMed]

Sy, Susan R., Kristen Fong, Rebecca Carter, Julia Boehme, and Amy Alpert. 2011. Parent support and stress among first-generation and continuing-generation female students during the transition to college. *Journal of College Student Retention* 13: 383–98. [CrossRef]

Thompson, Blair. 2008. How college freshmen communicate student academic support: A grounded theory study. *Communication Education* 57: 123–44. [CrossRef]

Thompson, Blair, and Joseph P. Mazer. 2009. College student ratings of student academic support: Frequency, importance, and modes of communication. *Communication Education* 58: 433–58. [CrossRef]

Tinto, Vincent. 1998. Colleges as communities: Taking research on student persistence seriously. *The Review of Higher Education* 21: 167–77.

Tinto, Vincent. 2001. Rethinking the First Year of College. Higher Education Monograph Series, Syracuse University. Available online: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.594.7760&rep=rep1&type=pdf (accessed on 7 December 2021).

Toews, Michelle L., and Ani Yazedjian. 2007. College adjustment among freshmen: Predictors for white and hispanic males and females. *College Student Journal* 41: 891–900.

van der Zanden, Petrie J. A. C., Eddie Denessen, Antonius H. N. Cillessen, and Paulien C. Meijer. 2018. Domains and predictors of first-year student success: A systematic literature review. *Educational Research Review* 23: 57–77. [CrossRef]

Villarruel, F., and P. Gardner. 2003. *Michigan State University Freshmen Assets Survey*. East Lansing: Michigan State University, Office of Community Youth Development.

Vogel, David L., and Meifen Wei. 2005. Adult attachment and help-seeking intent: The mediating roles of psychological distress and perceived social support. *Journal of Counseling Psychology* 52: 347–57. [CrossRef]

Walton, Gregory M., and Geoffrey L. Cohen. 2011. A brief social-belonging intervention improves academic and health outcomes of minority students. *Science* 331: 1447–51. [CrossRef] [PubMed]

Walton, Gregory M., Christine Logel, Jennifer M. Peach, Steven J. Spencer, and Mark P. Zanna. 2015. Two brief interventions to mitigate a "chilly climate" transform women's experience, relationships, and achievement in engineering. *Journal of Educational Psychology* 107: 468–85. [CrossRef]

Welle, Paul D., and Helen M. Graf. 2011. Effective lifestyle habits and coping strategies for stress tolerance among college students. *American Journal of Health Education* 42: 96–105. [CrossRef]

Wheatley, David. 1997. Stress, anxiety and depression. *Stress Medicine* 13: 173–77. [CrossRef]

Wills, Thomas A., and Ori Shinar. 2000. Measuring perceived and received social support. In *Social Support Measurement and Intervention: A Guide for Health and Social Scientists*. Edited by Sheldon Cohen, Lynn G. Underwood and Benjamin H. Gottlieb. New York: Oxford University Press, pp. 29–52.

Wilson, Gregory S., and Mary Pritchard. 2005. Comparing sources of stress in college student athletes and non-athletes. *Athletic Insight* 7: 1–8. Available online: http://amyburris.atspace.com/StressPDF.pdf (accessed on 7 December 2021).

Wilson, Shana M., Katherine E. Darling, Amy J. Fahrenkamp, Alexandra L. D'Auria, and Amy F. Sato. 2015. Predictors of emotional eating during adolescents' transition to college: Does body mass index moderate the association between stress and emotional eating? *Journal of American College Health* 63: 163–70. [CrossRef] [PubMed]

Wong, Jackie. 2017. A death on campus. *University Affairs*, September 6. Available online: https://www.universityaffairs.ca/features/feature-article/a-death-on-campus/ (accessed on 7 December 2021).

Wrench, Alison, Robyne Garrett, and Sharron King. 2013. Guessing where the goal posts are: Managing health and well-being during the transition to university studies. *Journal of Youth Studies* 16: 730–46. [CrossRef]

Zimet, Gregory D., Nancy W. Dahlem, Sara G. Zimet, and Gordon K. Farley. 1988. The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment* 52: 30–41. [CrossRef]