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Do First-Year Seminars Improve College Grades and Retention? A Quantitative Review of Their Overall Effectiveness and an Examination of Moderators of Effectiveness

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*We review the effectiveness of first-year seminars based on the widely used criteria of first-year grades and the 1-year retention rate. Meta-analytic results indicate that first-year seminars have a small average effect on both first-year grades (*k = *89,* N = *52,406,* δ = *0.02) and the 1-year retention rate (*k = *195,* N = *169,666,* δ = *0.11). We discuss the implications of these small effects and show that they are meaningful and have important consequences. Results also indicate that the effectiveness of first-year seminars for both criteria is substantially moderated by first-year seminar characteristics (e.g., type of seminar), institutional characteristics (e.g., 2-year or 4-year institution), and study characteristics (e.g., study design). We use these results to make recommendations about the design of first-year seminars that can maximize the positive effect on both the grades and retention of participants.*

Keywords: first-year seminar, orientation program, meta-analysis, effectiveness, retention, GPA, academic performance

Only 31% of first-time, full-time college students who enter a 2-year institution graduate within 3 years, whereas 59% of first-time, full-time students who enter a 4-year institution graduate within 6 years (Kena et al., 2014). The graduation rate is even lower for minority and part-time students (Lynch & Engle, 2010a, 2010b). These low completion rates represent a large misallocation of financial resources for educational institutions as well as lost time and a reduction in potential future earnings for many students (e.g., Day & Newburger, 2002). Raisman (2013) estimated that the total annual cost of attrition for the 1,669 colleges included in his study was almost $16.5 billion, with an estimated average of more

than $13 million per annum for a public institution. The total annual cost of attrition is even higher than this estimate when considering the lost tuition paid by parents and students, the lost future earnings by students, and the lost subsidies supplied by taxpayers.

Colleges and universities have attempted to increase student retention using a variety of strategies such as providing supplemental instruction, academic advising, and personal counseling (Habley & McClanahan, 2004; Noel-Levitz, 2013). One widely utilized retention tool is the first-year seminar—a course specifically designed to equip new students with the knowledge, skills, and abilities that are necessary to successfully meet the different transitional and developmental challenges that are faced in the first year of college. Barefoot (1992) defined a first-year seminar as

> a course intended to enhance the academic and/or social integration of first-year students by introducing them (a) to a variety of specific topics, which vary by seminar type; (b) to essential skills for college success; and (c) to selected processes, the most common of which is the creation of a peer support group. (p. 49)

In addition to being a common retention strategy, first-year seminars are a popular tactic for improving grades (a proximal cause of attrition for many students; Rummel, Acton, Costello, & Pielow, 1999).

First-year seminars have been offered at American colleges and universities for over a hundred years (Fitts & Swift, 1928; Gordon, 1989) and are currently offered at almost 90% of institutions (Padgett & Keup, 2011). More than half of these institutions have reported that over 90% of their students enroll in these courses (Young & Hopp, 2014). This widespread use of first-year seminars may stem, in part, from influential narrative reviews of the literature (e.g., Hunter & Linder, 2005; Pascarella & Terenzini, 2005) that suggest that first-year seminars are effective. For example, Pascarella and Terenzini (2005) concluded that

> the weight of evidence indicates that FYS [first-year seminar] participation has statistically significant and substantial, positive effects on a student's successful transition to college and the likelihood of persistence into the second year as well as on academic performance while in college. (p. 403)

Despite the conclusions drawn in narrative reviews, the empirical evidence for the effectiveness of first-year seminars—at least as measured by their observed effect on retention and academic performance—is mixed. Some authors have reported large positive effects on grades and retention (e.g., Blackett, 2008; DeRoma, Bell, Zaremba, & Albee, 2005; Rodriguez, 2003; Weisgerber, 2005), but others have reported only very small effects or even negative effects (e.g., Babbitt, 2007; Fry, 2006; Gaskins, 2009; Tebbe, 2007). Because of the lack of agreement on whether first-year seminars have the desired effect on these important outcomes and the accompanying lack of information about the characteristics of first-year seminars that maximize their effectiveness, this article aims to review and quantitatively summarize the existing literature on the effectiveness of first-year seminars.

A critical review of the empirical literature is also warranted when considering the costs associated with first-year seminars (e.g., staffing, training). Almost 75% of institutions offering a first-year seminar also employ a program director who is responsible for the design and implementation of the course (Padgett & Keup, 2011). Furthermore, in order to accommodate the increasing number of new students, colleges offer an average of 30 first-year seminar sections with an average compensation of $1,500 per section to instructors who are also often required to first attend training (Padgett & Keup, 2011; Young & Hopp, 2014). The total cost of these courses is likely to run into the hundreds of millions of dollars when considering that most of the 17.7 million currently enrolled undergraduate students (Kena et al., 2014) have either attended or are now enrolled in a first-year seminar. This high cost of first-year seminars, in conjunction with the reduced level of state support faced by many institutions (Padgett & Keup, 2011), suggests that first-year seminar directors are likely confronted with growing budget deficits. Therefore, evidence regarding the effectiveness of first-year seminars is likely to be highly beneficial to administrators who are attempting to determine the appropriate level of funding for first-year seminars.

Our quantitative review therefore offers two broad benefits. First, it will help resolve disagreements among researchers regarding the effectiveness of first-year seminars by determining both the overall average effect of first-year seminars and the degree to which variability in effectiveness estimates across studies are simply a function of sampling error or other study artifacts. A finding that first-year seminars have only low effectiveness might suggest that the significant financial resources currently being invested may be better invested in alternative approaches to increasing retention that have been shown to be relatively effective (e.g., counseling programs; Turner & Berry, 2000). Second, a quantitative review will also help determine whether the most effective first-year seminars share common characteristics. This, in turn, could provide first-year seminar administrators with evidence-based guidelines for modifying existing seminars in a manner that would maximize their effectiveness.

Our review will be able to determine whether there is evidence for the effectiveness of first-year seminars, but it will be difficult to establish a clear causal relationship between first-year seminar participation and important criteria. Randomized experiments characterized by random assignment to study conditions are rare due to the practical and ethical problems associated with denying some students access to programs that are designed to help them succeed. We therefore rely primarily on the extensive literature based on nonexperimental designs to evaluate the effectiveness of first-year seminars. Nonexperimental designs have two primary defining attributes. Assumed independent variables are measured rather than manipulated, and participants are not randomly assigned to conditions because the researcher does not control their assignment (Stone-Romero, 2011). These attributes distinguish nonexperimental designs from other research designs with increased validity for casual inferences (i.e., quasi-experimental designs and randomized experiments).

The most common type of nonexperimental research design used in the assessment of first-year seminars is the ex post facto design. This type of research design examines, in retrospect, the effects of a treatment on an outcome variable (Mohr,

1995). In evaluating first-year seminars, ex post facto designs use criterion data to compare seminar participants with nonparticipants. Although ex post facto research findings cannot definitively speak to the effectiveness of first-year seminars, a quantitative review of this literature can at least provide information on the degree to which there is support for the causal relationship that is often assumed by proponents of first-year seminars. An absence of supportive evidence from the ex post facto literature would suggest that the assumed effectiveness of first-year seminars requires further scrutiny and that randomized experiments may be required.

Choice of Criteria

First-year seminars are designed to provide new students with the knowledge, skills, and abilities that are necessary to overcome the different challenges of the first year of college. Goldstein and Ford (2002) defined training as the systematic acquisition of skills, concepts, or attitudes that result in improved performance in another environment. First-year seminars can therefore be considered a type of training program as they attempt to change the cognitions (i.e., amount of knowledge gained), affective responses (i.e., attitudes, beliefs, and values), and behaviors of participants (Fan, Buckley, & Litchfield, 2012; Kraiger, Ford, & Salas, 1993). Evaluations of training programs in organizational settings typically examine some subset of the four criteria of training effectiveness identified by Kirkpatrick (e.g., Kirkpatrick, 1959, 1994): (a) reaction criteria that reflect trainees' impressions and feelings about the training program, (b) learning criteria that reflect how much trainees learn while in the training program, (c) behavior criteria that reflect how much trainees' performance and behavior changes after completing the training program, and (d) results criteria that reflect the utility of the training program for the organization.

Our reading of the literature on the effectiveness of first-year seminars suggests that most program evaluations have used behavior and results criteria—specifically the first-year GPA (grade point average) and the 1-year retention rate. There are many reasons for this high level of interest in academic performance and retention. Johns and Saks (2014) defined organizational socialization methods as techniques designed to facilitate the adjustment of newcomers and enable the acquisition of necessary attitudes, behaviors, and knowledge. In educational institutions, socialization methods commonly involve some form of new student orientation (e.g., preterm orientation program, first-year seminar). The effectiveness of most organizational socialization efforts are evaluated according to the satisfaction, commitment, performance, and retention of organizational members (Bauer & Erdogan, 2011).

The 1-year retention rate is particularly important to institutions because the attrition rate is highest between the first and second years of enrollment (Upcraft, Gardner, & Barefoot, 2005). The significance of academic performance and retention to program evaluators is also evident when examining the objectives of first-year seminars. Developing academic skills (aimed at increasing academic performance) and developing a connection with the institution (aimed at increasing retention) are the two most frequently reported course objectives (Padgett & Keup, 2011). Colleges also focus on academic performance and retention due to

their fiscal importance. Retaining students is more economical than recruiting new students to replace those who have dropped out (Schuh & Gansemer-Topf, 2012), and students with high grades require far fewer support services such as tutoring and counseling. Because of the low graduation rates at many colleges and universities, these two criteria are also perhaps the most relevant. Therefore, we limit our examination of first-year seminars to the first-year GPA and the 1-year retention rate and define these criteria as the cumulative GPA at the end of the first academic year and the percentage of first-year students persisting to the second academic year, respectively.

Theoretical Frame

Entry Stress and Adjustment to College

Two distinct theoretical perspectives highlight the manner in which first-year seminars potentially affect academic performance and retention. The first of these perspectives takes the position that entry into college is an inherently stressful period with many transitional problems, in part because of the individuation and separation that occurs naturally in early adulthood (Chickering, 1969; Erikson, 1959; Wintre & Bowers, 2007) and in part because students are required to adjust to a novel environment. The transition of students from high school to college involves numerous adjustments to different academic and social challenges that extent beyond the greater academic demands that characterize higher education. For example, first-year college students are required to form new social contacts as they navigate a novel social environment and are expected to adapt to new roles and responsibilities in order to become productive members of the university community. Given these numerous environmental demands and uncertainties, entry stress (i.e., stress associated with entering a new environment) is commonly experienced by first-year students. Furthermore, the successful management of different entry stressors and thus adjustment to college requires that students possess the necessary coping skills and strategies. Considering the emphasis of previous researchers on the importance of supporting the adjustment needs of first-year students as early as possible (Astin, 1993; Tinto, 1993; Upcraft & Gardner, 1989), first-year seminars serve a critical function in the adjustment process.

Our theoretical framework for how first-year seminars facilitate the adjustment of college students is based on stress inoculation theory (e.g., Janis, 1983; Meichenbaum, 1996). According to stress inoculation theory, stress results when perceived environmental demands and uncertainties (i.e., stressors) exceed an individual's perceived coping resources (Lazarus & Folkman, 1984). In the first phase of stress inoculation, individuals are provided realistic information about their tasks, the novel environment, and the various expected stressors (Fan & Wanous, 2008). Based on Porter and Steers's (1973) theory of met expectations, there is usually a certain level of discrepancy between what newcomers expect to experience and what is actually experienced after organizational entry. Failure to adequately disconfirm these inaccurate and inflated pre-entry expectations of newcomers on entry can result in poor adjustment and increased turnover. Providing realistic information serves to adjust many of the inaccurate pre-entry beliefs and expectations of newcomers in order to better align them with post-entry organizational reality (Fan et al., 2012; Janis, 1983). Met-expectations

theory has received considerable empirical support (e.g., Wanous, Poland, Premack, & Davis, 1992). In the second phase of stress inoculation, individuals are taught various coping skills and strategies that expand their coping resources and increase their ability to deal with different stressors (Fan & Wanous, 2008; Meichenbaum, 1996).

From this theoretical perspective, first-year seminars attempt to reduce the entry stress of first-year students and thereby facilitate their adjustment by providing realistic information and increasing coping resources. Specifically, first-year seminars communicate information about the realities of the social and academic demands of college life that serve to better align the pre-entry expectations of new students with their actual post-entry experiences (e.g., the fast-paced nature of the first academic term, how standards and expectations in college differ from high school, the lack of an externally imposed structure). Furthermore, first-year seminars expand students' coping resources by informing them of the availability of different campus resources for managing adjustment difficulties (e.g., academic advisement, career services, individualized counseling, peer mentoring program) and teaching different coping skills and strategies that enable students to better manage various stressors (e.g., time management, study skills, problem-solving skills, goal setting, decision-making skills, cognitive restructuring, academic planning, critical thinking). First-year seminars also expand students' coping resources by providing social support from instructors who can also function as mentors and from peers who may also be experiencing similar adjustment difficulties. Seeking social support is an additional valuable coping strategy. Most of these different coping skills and strategies are attempts to directly reduce the cause of a stressor (i.e., problem-focused coping; Lazarus & Folkman, 1984) and function as buffers against the entry stress of new students (Cohen & Willis, 1985).

Students who are unable to adjust successfully are widely theorized to perform poorly in classes and exhibit an increased risk of dropping out. Thus, numerous authors have theorized that adjustment to college is a proximal determinant of both academic performance (e.g., Astin, 1993; Bean, 1980) and retention (e.g., Cabrera, Nora, & Castañeda, 1993; Hatcher, Kryter, Prus, & Fitzgerald, 1992; Pascarella & Terenzini, 1976; Spady, 1970). A common element of these theoretical approaches is that early experiences in college influence students' adjustment, and in turn, these levels of adjustment influence both grades and the decision to remain in college. Many researchers in the domain of adjustment have used the taxonomy of Baker and Siryk (1984) to conceptualize the structure of this construct (Credé & Niehorster, 2012).

Baker and Siryk (1984) classified adjustment to college into four types: academic adjustment, social adjustment, personal-emotional adjustment, and institutional attachment. Importantly, Baker and Siryk argued that adjustment to college is a multidimensional construct and represented by all four of these types of adjustment (Credé & Niehorster, 2012). Academic adjustment reflects the degree to which students have adapted to the more rigorous academic demands of higher education. Social adjustment reflects the degree to which students have adapted to the social demands of college and integrated into the social environment. Personal-emotional adjustment reflects the degree to which students experience physical and psychological distress resulting from the college environment.

Last, institutional attachment reflects the degree to which students feel affiliated with and committed to their institution.

Based on this multidimensional view of adjustment to college (Baker & Siryk, 1984), academic adjustment is proposed to directly affect academic performance as first-year students who fail to adequately adjust to the more rigorous academic demands of college are also more likely to struggle in their coursework (Credé & Niehorster, 2012). The theoretical relationship between the other types of adjustment and academic performance is proposed to have a spillover effect by which adjustment difficulties in any one of the three types (i.e., social adjustment, personal-emotional adjustment, institutional attachment) reduces the ability to adjust in other types. For example, social isolation resulting from poor integration with an institution's social environment (i.e., poor social adjustment) is likely to increase the experience of stress and anxiety due to the college environment (i.e., poor personal-emotional adjustment) and, in turn, interfere with a student's ability to perform at a high level academically.

The theoretical relationship between adjustment to college and retention is viewed as either a mediated effect or a direct effect (Credé & Niehorster, 2012). The mediated effect is observed when academic adjustment difficulties lead to unsatisfactory grades that, in turn, result in the voluntary decision to withdraw from college or result in academic dismissal due to poor grades. Even more students, however, fail to persist in college for nonacademic reasons (Rummel et al., 1999). Therefore, a direct effect on retention is observed when poor social adjustment, personal-emotional adjustment, or institutional attachment increase the likelihood of withdrawal from college (Bean, 1980; Credé & Niehorster, 2012; Pascarella, 1980; Spady, 1970; Tinto, 1975). For example, poor institutional attachment (i.e., reflecting low levels of commitment to an institution) is likely to reduce a student's willingness to graduate from an institution. Institutional attachment has been emphasized as an important determinant of retention in many theoretical frameworks (e.g., Bean, 1980; Pascarella, 1980; Tinto, 1975).

The various theoretical models that highlight the importance of adjustment to college for academic performance and retention have received relatively widespread empirical support (e.g., Bean & Metzner, 1985; Cabrera et al., 1993). In a recent meta-analytic review, Credé and Niehorster (2012) also found that students' adjustment to college is predictive of both retention and grades. Notably, Credé and Niehorster reported that the strongest relationships are between retention and students' level of institutional attachment ($\rho = 0.29$) and their level of social adjustment ($\rho = 0.25$), whereas first-year GPA is most strongly predicted by students' level of academic adjustment ($\rho = 0.36$). Therefore, interventions designed to hasten the adjustment to college should have a positive effect on both grades and retention. That is, first-year seminars that foster students' adjustment by providing realistic information and expanding students' coping resources should have a positive effect on both grades and retention.

College Knowledge and Motivation

The second theoretical perspective that highlights the manner in which first-year seminars potentially affect grades and retention borrows heavily from theoretical models of performance developed in organizational settings and emphasizes

the important role of academic skills and motivation. Campbell's model of performance (Campbell, 1990; Campbell, McCloy, Oppler, & Sager, 1993) specifies three direct determinants of performance: declarative knowledge, procedural knowledge, and motivation. Declarative knowledge includes knowledge of facts and principles and can be characterized as knowledge of what needs to be done. In an academic setting, declarative knowledge might include knowledge that was acquired during prior schooling and new knowledge learned in classes, but it can also include awareness of knowledge deficits (e.g., recognizing that material is not well understood and that further studying is required). Procedural knowledge refers to an individual's knowledge of how to do things, for example, knowledge of how to study effectively or how to ask for an instructor's assistance. Motivation, the third proximal determinant, reflects the willingness to expend high levels of effort for long periods on performance relevant tasks.

These three theoretical determinants of academic performance have found substantial empirical support. First, there is ample support that variables that are largely stable—and hence likely to be unresponsive to interventions—are predictive of academic performance and retention. These include variables that reflect declarative knowledge such as prior academic performance (i.e., high school GPA; Bridgeman, McCamley-Jenkins, & Ervin, 2000) and academic preparedness (Kuncel & Hezlett, 2007). Variables reflecting procedural knowledge have also been shown to be highly predictive of academic performance, specifically study skills and study habits (Credé & Kuncel, 2008; Robbins et al., 2004), help-seeking behavior (Karabenick, 2003), learning strategies (Credé & Phillips, 2011), and time management skills (Britton & Tesser, 1991). Because of the greater specificity and more behavioral nature, these determinants of academic performance might be more easily targeted in short- to medium-term interventions.

First-year seminars that focus on the development of these skills should therefore have a positive effect on academic performance. For example, first-year seminars may improve grades by helping students understand that different classes may require different strategies for maximizing learning and academic performance—as suggested by social-cognitive views of the learning process (Duncan & McKeachie, 2005; Pintrich, 2000). First-year seminars may also help students understand the need to engage in self-regulated learning (Rotgans & Schmidt, 2009; Zimmerman, 1990)—an important set of behaviors because college classes typically provide performance feedback less regularly than students may have received in high school. In addition to being a valuable procedural knowledge construct, self-regulated learning also incorporates motivational processes that have important implications for student grades. Similarly, first-year seminars may improve grades by helping students understand the importance of short-term and long-term goal setting and assist them in understanding the necessary steps to reach graduation.

The general concept of goals as a motivational construct has received considerable empirical support (e.g., Austin & Vancouver, 1996; Locke & Latham, 1990). Motivational constructs, of course, also have been shown to be highly predictive of academic performance. For example, first-year seminars can target attitudinal and motivational factors such as study attitudes, achievement motivation, and

even simple class attendance that have exhibited relatively strong relationships with college grades (e.g., Credé & Kuncel, 2008; Credé, Roch, & Kieszczynka, 2010; Lotkowski, Robbins, & Noeth, 2004). Although Campbell's model is a model of performance—and not of retention—the effect of declarative knowledge, procedural knowledge, and motivation on grades also implies a positive effect of these variables on retention because many students who drop out of college do so, at least in part, due to academic difficulties (Rummel et al., 1999).

Summary

Our two broad theoretical frameworks—one centered on reducing entry stress and facilitating adjustment to college and the other centered on improving declarative knowledge, procedural knowledge, and motivation—suggest that first-year seminars can increase retention and improve academic performance if they provide one or more of the following: (a) information about the realities of the social and academic demands of college to adjust inaccurate pre-entry beliefs and expectations, (b) assistance in managing adjustment difficulties and entry stress by teaching various coping skills and strategies, (c) information and training in skills that are important for academic success, and (d) efforts to increase the motivation of students to succeed in college. A wide variety of specific first-year seminar activities and exercises may foster students' adjustment to college and enhance declarative and procedural knowledge as well as motivation, including an orientation to campus resources, information about campus policies, career planning using short-term and long-term goal setting, and the development of effective coping skills such as time management and study skills.

Moderators of First-Year Seminar Effectiveness

We hypothesize that first-year seminars are likely to have a positive effect on both first-year grades and the 1-year retention rate. In addition, we expect that the observed effectiveness of first-year seminars is moderated by the characteristics of first-year seminars, the characteristics of the institutions in which they take place, and the characteristics of the studies that are used to investigate the effectiveness of first-year seminars. The possibility that seminar characteristics moderate the effectiveness of first-year seminars is supported by prior research on the characteristics of effective training programs in organizational settings. A meta-analytic review of this literature (Arthur, Bennett, Edens, & Bell, 2003) found that both the content of training programs and the training method (e.g., lectures, discussions, audiovisual) significantly moderated the effectiveness of organizational training programs. Similar findings from reviews of more specialized training programs (e.g., flight simulator training effectiveness; Hays, Jacobs, Prince, & Salas, 1992) also support the moderating effect of program characteristics on program effectiveness.

We base our approach to evaluating the effectiveness of first-year seminars on the approach taken by these prior quantitative reviews of the effectiveness of training programs. We not only expand on the range of seminar characteristics that we consider as possible moderators of the effectiveness of first-year seminars, but we also include institutional characteristics and study characteristics as additional potential moderators. Certain characteristics of seminar participants are

also considered as moderators and discussed in the forthcoming section. Each of the first-year seminar characteristics, institutional characteristics, and study characteristics, which we examine as potential moderators, is described below.

First-Year Seminar Characteristics

First-Year Seminar Type

National surveys of first-year seminars (e.g., Padgett & Keup, 2011; Young & Hopp, 2014) have used the typology developed by Barefoot (1992) to classify seminars. Barefoot categorized first-year seminars based on course content into four broad types. Extended orientation seminars focus primarily on facilitating students' adjustment to college. Topics covered by extended orientation seminars include an introduction to campus resources, college policies and procedures, basic study skills, time management, and learning strategies (Barefoot, 1992). Academic seminars, on the other hand, focus primarily on the development of academic skills such as critical thinking, expository writing, and oral communication skills. Discipline-linked seminars serve as an introduction to a specific major and prepare students for the demands of that particular course of study. Last, basic study skills seminars focus on the development of more narrowly defined academic skills such as study skills, grammar, and note taking. Importantly, these content categories are not mutually exclusive; institutions can design hybrid seminars characterized by more than one type of content category.

Because a prior meta-analytic review (Hattie, Biggs, & Purdie, 1996) already examined the effectiveness of basic study skills courses and because many of these are open to all students (i.e., not just first-year students), we excluded all basic study skills seminars from this review. Additionally, no data on discipline-linked seminars that met our inclusion criteria were available. First-year seminars were thus coded as either an extended orientation seminar, academic seminar, or hybrid seminar; the coding being determined by the reported course description and covered topics of each first-year seminar. The large majority of coded hybrid seminars combined the content of extended orientation and academic seminars.

Because of the strong relationship between GPA and factors such as academic skills and knowledge (e.g., Credé & Kuncel, 2008; Robbins et al., 2004), learning strategies (Credé & Phillips, 2011), and basic academic behaviors (Credé et al., 2010), we expect that academic seminars (or hybrid seminars providing some academic content) will have a larger effect on the first-year GPA than extended orientation seminars (Hypothesis 1A). Because of the importance of adjustment to college for retention (e.g., Credé & Niehorster, 2012), we expect that extended orientation seminars (or hybrid seminars providing some orientation content) will have a larger effect on the 1-year retention rate than academic seminars (Hypothesis 1B).

First-Year Seminar Structure

First-year seminars are sometimes linked with other classes as part of a learning community—defined by Gabelnick, Macgregor, Matthew, and Smith (1990) as follows:

> Any one of a variety of curricular structures that link together several existing courses—or actually restructure the material entirely—so that students have

> opportunities for deeper understanding and integration of the material they are learning, and more interaction with one another and their teachers as fellow participants in the learning enterprise. (p. 19)

Learning communities lead to both greater levels of student engagement (Zhao & Kuh, 2004) and institutional commitment (Stassen, 2003). Student engagement and institutional commitment, in turn, are moderately predictive of both student grades and retention (Lotkowski et al., 2004). Learning community participants also achieve higher grades and are retained at a higher rate than students in respective stand-alone courses (Price, 2005). We therefore expect that first-year seminars will be more effective when embedded within a learning community than first-year seminars that are stand-alone courses (Hypothesis 2).

First-Year Seminar Instructor

Institutions use instructors with varying levels of expertise to teach first-year seminars. Some rely on graduate students or even senior undergraduate students, whereas others make sole use of faculty or administrative staff as first-year seminar instructors. Faculty and administrative staff are likely to be able to provide more accurate information regarding the academic demands faced by students, have more extensive experience in using various teaching pedagogies, and are likely to be seen as more credible sources of information. We therefore expect that first-year seminars will be more effective when taught by faculty or administrative staff than first-year seminars taught in part by students (Hypothesis 3A).

A second relevant characteristic of seminar instructors is whether they have been provided with specialized training to help them acquire the skills and knowledge required to be an effective first-year seminar instructor. We expect that first-year seminars taught by trained instructors will be more effective than first-year seminars taught by untrained instructors or taught by instructors for whom training information was not provided (Hypothesis 3B).

First-Year Seminar Length

First-year seminars vary substantially in terms of the total hours of instruction experienced by students and in terms of the number of credits granted for completion. Some first-year seminars are short and spread over a few weeks at the beginning of a term (or even prior to the start of a term), whereas others involve regular class meetings for the entire first term. Similarly, some institutions do not offer any credit for seminar completion, whereas other institutions offer course credits. Prior findings from the training literature (e.g., Cole, 2008) suggest that longer programs are more effective, and we expect that seminar length, based on the total hours of instruction or the number of credits granted, will be positively associated with first-year seminar effectiveness (Hypothesis 4).

First-Year Seminar Grading

Some first-year seminars are graded strictly on a pass/fail basis, whereas others assign letter grades on an A to F scale. Pass/fail grading systems have long been associated with lower motivation levels in students (e.g., Hales, Bain, & Rand, 1973). We therefore expect that first-year seminars graded on an A to F scale will

be more effective than first-year seminars graded using the pass/fail option (Hypothesis 5).

First-Year Seminar Target Population

First-year seminars also vary with regard to their target population. Some focus primarily on academically underprepared students (as defined by low admissions test scores and low high school grades) who are more likely to struggle academically and have a greater risk of attrition, whereas others focus on the entire incoming class of first-year students. Another common distinction is between first-year seminars that target students living off-campus and those that target students living on-campus. Students living off-campus have been found to be at a greater risk of low academic achievement and attrition because of less contact with other students and faculty (Johnson, 1997) and greater difficulty to integrate with the institution (e.g., Pascarella & Terenzini, 1991; Wintre & Bowers, 2007). Interventions designed to assist academically underprepared and off-campus students have a greater ability to have a positive effect than interventions for students who do not face the same academic or social challenges (i.e., academically prepared and on-campus students).

We therefore expect that first-year seminars for academically underprepared students will be more effective than first-year seminars targeted at all first-year students (Hypothesis 6A). In addition, we expect that first-year seminars will be more effective when a greater proportion of first-year students reside off-campus as compared with when a lesser proportion of first-year students reside off-campus. That is, we expect that first-year seminar effectiveness will be negatively associated with the proportion of first-year students residing on-campus (Hypothesis 6B).

Institutional Characteristics

Attrition Rate

Institutions differ from each other with respect to the proportion of students who fail to persist to the second academic year. These differences in 1-year attrition rates introduce an additional source of variability in effect sizes for the retention rate criterion because the base rate of a dichotomous criterion affects the size of observed correlations (McGrath & Meyer, 2006; McLennan, 1988), with effects being attenuated downward as the base rate deviates from 50%. Because some institutions have lower retention rates than others (and very few have 1-year attrition rates greater than 50%), we expect that first-year seminar effectiveness based on the 1-year retention rate criterion will be positively associated with the overall sample 1-year attrition rate (Hypothesis 7).

Other Institutional Characteristics

A number of institutional characteristics are also potential moderators of first-year seminar effectiveness. For example, institutions differ in terms of the types of degrees that are granted and in terms of their admissions standards. Because of lower average admissions test scores and lower levels of academic preparedness, students in 2-year community colleges may benefit more from first-year seminar participation than students in 4-year colleges (Sparks & Malkus, 2013). We therefore expect that first-year seminars at 2-year institutions will be more effective

than first-year seminars at 4-year institutions (Hypothesis 8A). Similarly, students at institutions with low acceptance rates are likely to have higher academic aptitude and achievement motivation. Therefore, first-year seminars at such institutions are likely to be less effective than similar seminars offered at institutions with higher acceptance rates. For that reason, we expect that first-year seminar effectiveness will be positively associated with the institutional acceptance rate (Hypothesis 8B).

Because of the presence of a larger number of community colleges (i.e., institutions with high acceptance rates and low admissions standards), public institutions have, on average, lower 1-year retention rates than private institutions (ACT, 2014) and therefore are likely to have more students who would benefit from first-year seminar participation. Thus, we expect that first-year seminars at public institutions will be more effective than first-year seminars at private institutions (Hypothesis 8C). We also examined two other institutional characteristics: the size of the institution at the time that data were gathered (i.e., total enrollment) and student ethnicity (defined as the proportion of the student population comprising White students). However, we made no a priori predictions about the direction of any possible effect.

Study Characteristics

Definition of First-Year Seminar Participants

In some studies, first-year seminar participants were defined as students who completed the seminar and received a grade. In other studies, participants were defined as students who simply enrolled in the seminar, irrespective of whether they completed the course. Students who enroll but fail to complete the course are not exposed to the full treatment effect of the seminar. We therefore expect that first-year seminars will be more effective when participants are students completing the course than when participants are simply students enrolling in the course (Hypothesis 9).

Publication Source

Meta-analytic reviews have often examined the possibility that the literature on a particular relationship is characterized by the "file-drawer effect" whereby nonsignificant findings (i.e., small effects) are less likely to be published in peer-reviewed journals. Thus, a review (narrative or meta-analytic) based purely on peer-reviewed articles would result in an overestimate of the strength of the relationship. Although the strength of the file-drawer effect appears to be weak or nonexistent in many fields (Hunter & Schmidt, 2004), we examined the possible difference between the effects described in peer-reviewed sources and the effects described in other sources (books, dissertations, and technical reports). We expect that first-year seminar effectiveness will be higher for studies described in peer-reviewed publications than for studies described in non–peer-reviewed publications (Hypothesis 10).

Year of Publication and Year of Treatment

To examine whether the effectiveness of first-year seminars has changed over time, we also examined the potential moderating effect of the year in which the

study was published and the year in which the first-year seminar being described in a study took place. We had no a priori expectations about the direction of the effects.

Study Design

Studies that have evaluated the effectiveness of first-year seminars can be classified into three types of research design. The first design was a randomized experiment in which students were randomly assigned to the treatment (i.e., seminar participant) or control condition (i.e., seminar nonparticipant). The second design was an ex post facto design using matching where criterion data of seminar participants were compared with the criterion data of seminar nonparticipants who had similar admissions test scores or high school GPA. The third design was a simple ex post facto design where criterion data of seminar participants were compared with the criterion data of seminar nonparticipants, without any attempt to match on relevant characteristics.

Randomized experiments are the ideal design for evaluating seminar effectiveness. This design, however, is rarely used because of the ethical and practical problems associated with randomly assigning college students to a condition that denies them access to a first-year seminar. Therefore, ex post facto designs are frequently used in evaluating first-year seminars. However, these designs are associated with multiple threats to internal validity. The selection bias is the primary threat in an ex post facto design and is defined as any systematic existing differences in participant characteristics across study conditions that could also cause observed effects (Shadish, Cook, & Campbell, 2002). Given that the majority of first-year seminar participants in ex post facto designs are voluntary enrollees (Padgett & Keup, 2011), selection is a major threat to the validity of study findings as students who choose to enroll in a first-year seminar may differ on a number of potentially important variables from those students who choose to not enroll. On the one hand, it could be argued that students who enroll voluntarily are those who are more motivated and committed to their academic careers, which may translate into higher retention and better grades. On the other hand, students who enroll voluntarily may be those who are concerned about struggling in college due to their relatively poor high school academic performance or difficulties with adjusting to college life. This, in turn, would result in students who enroll voluntarily possibly having lower retention and grades.

The main problem posed by the selection bias is the confounding of the effects of an intervention with differences between populations. There may be important preexisting differences between the average first-year seminar participant and nonparticipant. These differences in participant characteristics may explain observed study effects, irrespective of first-year seminar effectiveness. For example, observed differences in grades or retention between first-year seminar participants and nonparticipants can be artificially inflated by variables that influence both grades and retention (e.g., past academic achievement, motivation).[1] Similarly, observed differences can be attenuated by diffusion whereby information learned by first-year seminar participants spreads to nonparticipants via social interaction. We therefore specify no a priori hypotheses about the direction of any effect.

Method

Literature Search

Sources of data were identified by keyword searches of the ERIC, Education Full Text, PsycINFO, and Dissertation Abstracts databases. Searches of these databases were conducted using the following keywords: *first-year seminar, first-year orientation, freshman seminar, freshman orientation, new student orientation, new student class, orientation class, orientation seminar, transition class, transition seminar, University 101, success course*, and *college survival seminar*. Additional potential sources were identified by examining the citations of obtained sources and the references of the narrative review by Pascarella and Terenzini (2005). These searches yielded 682 sources that were examined to determine if they contained data that could be included in the review.

Inclusion Criteria

Studies were included in the review if information was presented that allowed computation of the standardized difference in either the first-year GPA or the 1-year retention rate between first-year seminar participants and nonparticipants. We limited our coding to these two criteria and therefore excluded data on GPA for periods other than the first year as well as data on retention for periods other than the 1-year rate. Importantly, we excluded studies that reported persistence to the end of the first year (as opposed to the beginning of the second year) because departure decisions are often made between the end of the first year and the beginning of the second year. Furthermore, studies were only included if they met the following criteria:

1. Initial enrollment in the first-year seminar occurred during the summer preceding the start of the first term (i.e., first semester or quarter) or during the first term, as opposed to the second term. Given that first-year seminars are often intended for new incoming students without college experience, more experienced second-term students who enroll in a seminar for the first time are less likely to benefit from participation. Therefore, the inclusion of such studies would have potentially resulted in a reduced measure of first-year seminar effectiveness.
2. Course instruction took place in a classroom, as opposed to online or outdoors. We wanted to eliminate any possible differences in first-year seminar effectiveness that may have resulted from differences in delivery medium (online vs. face-to-face). Therefore, the few studies with online first-year seminars were excluded. Furthermore, we excluded any first-year seminar held outdoors. These courses are often referred to as "wilderness orientation programs" and defined as "orientation experiences for small groups of first-year students that use adventure experiences and include at least one overnight in a wilderness setting" (Bell, Holmes, & Williams, 2010, p. 2). Wilderness orientation programs were not classified by Barefoot (1992) as a type of seminar. We agree with Barefoot and view this type of orientation activity as inherently different from the more traditional first-year seminar. Specifically, wilderness orientation programs

differ in content and focus, rarely provide credit for participation, are optional, and generally supplement rather than replace a traditional first-year seminar (Bell et al., 2010; Galloway, 2000).

3. First-year seminar participants were students from various residences, as opposed to students from a specific residential hall. This criterion prevented the confounding of first-year seminar effectiveness with any effect that may have resulted from the sharing of the same living space.
4. The only difference in treatment experienced between first-year seminar participants and nonparticipants was the first-year seminar, as opposed to additional services such as mentoring, tutoring, or counseling. This criterion ensured that aside from first-year seminar participation, there were fewer other plausible explanations for any observed differences in the grades or retention of participating and nonparticipating students.

Despite not excluding studies based on country, all data included in the final database came from either the United States or Canada. Applying these inclusion criteria to the examined studies resulted in a database comprising 284 independent samples, 89 samples that examined the effect of first-year seminars on the first-year GPA, and 195 samples that examined the effect of first-year seminars on the 1-year retention rate.

Coding Process

For each study, a systematic coding procedure was followed. Information reflecting the effect of first-year seminar participation on first-year grades and the 1-year retention rate was coded using the standardized difference (Cohen's *d*) as an indicator of the effect size. For the grades criterion, this was computed from the means and standard deviations of first-year seminar participants and nonparticipants. For the retention criterion, Cohen's *d* was computed using the proportion of students from both groups who were retained to the beginning of the second academic year. Cohen's *d* is biased upward for small samples ($N < 20$), but this effect is trivially small for medium to large sample sizes (Hunter & Schmidt, 2004) and effectively zero for the very large samples found in this meta-analytic review. We also coded the number of first-year seminar participants and the number of nonparticipants (i.e., students used as a comparison or control group).

Furthermore, information on each of the variables identified earlier as potential moderators of first-year seminar effectiveness was also coded. Some of the information that was coded (e.g., size of the institution) was often not available in the original source but was obtained by conducting searches of the institution's website. All studies were coded by the first author of this article, with the second author conducting accuracy checks of a random selection of one third of all coded effects and study characteristics. These accuracy checks found more than 99% agreement in coding decisions with only seven errors of omission (e.g., effects that could be coded but had originally not been coded) and six coding disagreements. All disagreements involved the coding of moderator variables (i.e., not effect sizes) and were resolved via discussion. All studies were subsequently checked again to ensure that no further errors of omission had been made.

Analytic Strategy

We followed a three-pronged analytic strategy to investigate the average effectiveness of first-year seminars and the possible moderating role of seminar characteristics, institutional characteristics, and study characteristics on first-year seminar effectiveness. First, to estimate the average effectiveness of seminars, we used the Hunter and Schmidt (2004) interactive psychometric meta-analytic method based on a random effects model to compute meta-analytic estimates of the standardized difference (i.e., δ) between the grades and between the retention rates of first-year seminar participants and nonparticipants. Hunter and Schmidt's random effects model is favored over alternative approaches (e.g., Hedges and Olkin's [1985] fixed effects approach) because it provides an estimate of the average effectiveness of first-year seminars in the absence of attenuating effects (e.g., range restriction in the criterion) and an estimate of the proportion of observed variability in effect sizes that can be attributed to sampling error and differences in other study artifacts (e.g., unreliability in the measurement of the criterion).

The Schmidt and Le (2004) software package used for this analysis provides an estimate of the amount of variability in observed effect sizes that remains after accounting for these study artifacts (i.e., SD_{δ}), and this value provides information as to the presence or absence of moderators of first-year seminar effectiveness. We corrected for the unreliability in GPA using previously published estimates of the internal consistency of college GPA (Barritt, 1966; Bendig, 1953; Reilly & Warech, 1993; Stricker, Rock, Burton, Muraki, & Jirele, 1994). It is quite likely that retention data and seminar participation data are also characterized by some measurement error (e.g., due to transcription errors from university records). However, no information about the size of such errors was available, and we therefore did not make any corrections for the independent variable (i.e., first-year seminar participation or nonparticipation) or for the 1-year retention rate criterion.

Second, we used the subgroup method described by Hunter and Schmidt (1990) to examine the effect of individual categorical moderators and weighted least-squares (WLS) regression to examine the effect of individual continuous moderators. For categorical moderators, separate meta-analytic estimates were computed for each level of the moderator. For continuous moderators, we used WLS regression to regress the observed effect size onto each individual moderator using the inverse variance of the effect size as a weight, as recommended by Hedges and Olkin (1985) and Sanchez-Meca and Marin-Martinez (1998). In this way, studies with more precise effect size estimates, primarily because of their larger samples sizes, were given greater weight in the moderator analysis—unlike an ordinary least squares regression-based moderator analysis in which studies are given equal weight. Using equal weights is undesirable because that would result in a study based on 20 students being given the same weight as a study based on 2,000 students. The effect size observed in each study was therefore used as the dependent variable, the continuous moderator under consideration was used as the independent variable, and all observations were weighted by the inverse variance of the effect size. The standardized regression coefficient from

this analysis is equivalent to the correlation between the continuous moderator and the effectiveness of the first-year seminar.

Because the examined moderators were not independent from each other, the findings from the subgroup method and WLS regression with just one independent variable must be interpreted with caution. That is, the apparent effect of a moderator may be an artifact of the effect of a second moderator that is correlated with the first moderator. Similarly, the real effect of a moderator may be obscured by the effect of a second moderator that is correlated with the first moderator. We therefore also relied on a third methodology, WLS multiple regression to estimate the unique effects of each examined moderator on the observed effectiveness of first-year seminars, as recommended by Hunter and Schmidt (2004) and Steel and Kammeyer-Mueller (2002). It is important to note that we did not perform WLS regression using the complete set of examined moderators because of incomplete data on first-year seminar characteristics, institutional characteristics, and study characteristics for many effect sizes as well as very strong correlations among some moderator variables (e.g., year of publication and year of treatment).

For example, we excluded the moderator variable reflecting the proportion of first-year students living on-campus because this information was not available for the majority of studies. Thus, 11 potential moderator variables were examined simultaneously for the first-year GPA criterion, and 15 potential moderator variables were examined simultaneously for the 1-year retention rate criterion. We divided these into three categories: first-year seminar characteristics, institutional characteristics, and study characteristics. In this way, we examined both the unique contribution of each moderator variable to first-year seminar effectiveness and the relative importance of situational characteristics (seminar characteristics and institutional characteristics) versus study characteristics.

It is important to note that for both types of analysis (meta-analysis and WLS regression), we amended the sample size for each observed effect size to be twice the treatment group size. In many of the included studies, a relatively small number of first-year seminar participants were compared with a very large number of first-year seminar nonparticipants. Rather than using a simple aggregate of these two sample sizes as the overall sample size for the effect size, we calculated a sample size that assumed equally large groups in order to not artificially inflate our overall sample size and to weight studies more appropriately. This was calculated by doubling the number of students who received the treatment (i.e., seminar participants). For example, if a study reported data on 200 students who participated in a first-year seminar and compared these students with 5,000 students who did not participate, we coded the study as having a sample size of 400 (200×2) rather than 5,200 ($200 + 5{,}000$).

Results

Overall Effectiveness

Meta-analytic estimates of the overall effectiveness of first-year seminars are presented in Table 1. Effects were very small for the first-year GPA criterion and only slightly larger for the 1-year retention rate criterion, indicating that the average first-year seminar has almost no effect on the first-year GPA and only a small

TABLE 1

Meta-analytic estimates of the overall effectiveness of first-year seminars for the first-year GPA and the 1-year retention rate criteria

Criterion	N	k	d_{obs}	SD_{obs}	δ	SD_{δ}	80% CV LL	80% CV UL	Artifact variance
GPA	52,406	89	0.01	0.15	0.02	0.14	−0.16	0.19	30.88
Retention	169,666	195	0.11	0.13	0.11	0.11	−0.02	0.25	29.40

Note. GPA = grade point average; k = number of unique studies; d_{obs} = sample size weighted mean observed effect size; SD_{obs} = standard deviation of sample size weighted observed effect sizes; δ = sample size weighted mean effect size after correcting for unreliability in criterion (for GPA); SD_{δ} = standard deviation of effect sizes after removing variability due to sampling error and unreliability in criterion (for GPA); CV = credibility interval; LL = lower limit; UL = upper limit; artifact variance = estimate of the proportion of observed variance (%) in effect sizes that is due to sampling error and unreliability in criterion (for GPA).

positive effect on the 1-year retention rate of participating students. Importantly, the credibility intervals for both estimates contained zero, indicating that the observed small effects do not generalize across situations. That is, there appear to be some first-year seminars that are relatively effective, whereas others have no effect at all. The relatively wide credibility intervals and the fact that examined study artifacts only explained a relatively small proportion of the observed variance suggests that an examination of potential moderators is warranted.

Subgroup Moderator Analysis

Results for the subgroup moderator analyses for the first-year GPA and the 1-year retention rate criteria are presented in Table 2 and Table 3, respectively. The last column in these tables provides a z score for the difference between the two effect sizes. Because of the number of examined moderators, we used a conservative alpha level of .01 to interpret our findings.

For the first-year GPA criterion, 7 of the 10 examined categorical moderators were significant. In support of Hypothesis 1A, hybrid seminars providing some academic content were more effective than extended orientation seminars. In support of Hypothesis 3A, first-year seminars were more effective when taught by faculty or administrative staff rather than when students were also involved as instructors. Hypothesis 3B was supported as first-year seminars were more effective when taught by trained instructors than when taught by untrained instructors or when taught by instructors for whom training information was not provided. Hypothesis 8A was supported as mean first-year seminar effectiveness at 2-year institutions was significantly higher than the mean effectiveness observed at 4-year institutions, although we only found data from seven 2-year institutions, and this effect should therefore be interpreted with some caution.

Hypothesis 8C was not supported because mean first-year seminar effectiveness at private institutions was significantly higher than the mean effectiveness

(Text continues on p. 300.)

TABLE 2

Subgroup moderator analysis for the first-year GPA criterion

Categorical moderators	N	k	d_{obs}	SD_{obs}	δ	SD_{δ}	80% CV LL	80% CV UL	Artifact variance	z
Type of first-year seminar										
Extended orientation[a]	40,824	71	−0.01	0.15	−0.01	0.14	−0.19	0.17	30.91	5.41
Hybrid[a]	11,147	16	0.09	0.11	0.11	0.08	0.00	0.21	52.38	
Course instructor										
Faculty or administrator	17,723	35	0.11	0.13	0.12	0.10	−0.00	0.25	50.81	9.51
Students involved	29,161	29	−0.05	0.10	−0.06	0.09	−0.17	0.05	40.45	
Instructor training										
Provided	12,487	14	0.06	0.11	0.07	0.10	−0.06	0.19	36.73	3.12
Not provided or unknown	39,919	75	0.00	0.16	0.00	0.15	−0.19	0.19	30.94	
Grading system										
A to F	41,736	55	0.00	0.13	0.00	0.12	−0.15	0.15	32.10	0.82
Pass/fail	3,363	7	0.03	0.10	0.03	0.05	−0.03	0.09	81.76	
Target population										
Academically underprepared	5,188	20	0.02	0.19	0.02	0.17	−0.19	0.23	41.61	0.25
All first-year students	47,218	69	0.01	0.14	0.02	0.14	−0.16	0.19	28.74	
Type of institution										
Private	1,419	9	0.20	0.08	0.22	0.00	0.22	0.22	100.00	3.92
Public	50,987	80	0.01	0.15	0.01	0.14	−0.17	0.19	29.22	

(continued)

TABLE 2. (continued)

Categorical moderators	N	k	d_{obs}	SD_{obs}	δ	SD_{δ}	80% CV LL	80% CV UL	Artifact variance	z
Type of institution										
2-year	2,481	7	0.19	0.13	0.22	0.08	0.11	0.32	69.67	5.08
4-year	49,925	82	0.01	0.14	0.01	0.13	−0.16	0.18	31.83	
Definition of participants										
First-year seminar enrollees	40,356	50	0.01	0.15	0.01	0.15	−0.18	0.19	22.85	2.19
First-year seminar completers	12,050	39	0.05	0.15	0.05	0.11	−0.08	0.19	59.38	
Publication source										
Peer-reviewed	12,675	36	0.08	0.14	0.09	0.10	−0.03	0.22	59.96	4.88
Non–peer-reviewed	39,731	53	−0.01	0.15	−0.01	0.14	−0.19	0.17	25.34	
Study design										
Randomized experiment[b]	733	7	0.36	0.28	0.40	0.22	0.12	0.68	50.92	3.65[b,c]
Ex post facto using matching[c]	5,770	16	0.10	0.15	0.11	0.12	−0.04	0.26	49.35	3.97[c,d]
Ex post facto without matching[d]	45,903	66	−0.00	0.13	−0.00	0.12	−0.16	0.16	31.77	5.33[b,d]

Note. GPA = grade point average; k = number of unique studies; d_{obs} = sample size weighted mean observed effect size; SD_{obs} = standard deviation of sample size weighted observed effect sizes; δ = sample size weighted mean effect size after correcting for unreliability in GPA criterion; SD_{δ} = standard deviation of effect sizes after removing variability due to sampling error and unreliability in GPA criterion; CV = credibility interval; LL = lower limit; UL = upper limit; artifact variance = estimate of the proportion of observed variance (%) in effect sizes that is due to sampling error and unreliability in GPA criterion; z = z score comparison of effect size based on Fisher r-to-z transformation. $p < .01$ (one-tailed) when z score > 2.33.

[a]For the GPA criterion no data on academic seminars were available. [b,c,d]Superscripts denoting which pair of study designs is being compared.

TABLE 3

Subgroup moderator analysis for the 1-year retention rate criterion

Categorical moderators	N	k	d_{obs}	SD_{obs}	δ	SD_{δ}	80% CV LL	80% CV UL	Artifact variance	z
Type of first-year seminar										
Extended orientation[a]	156,435	169	0.12	0.13	0.12	0.11	−0.02	0.25	27.59	1.92[ab]
Academic[b]	1,872	5	0.03	0.04	0.03	0.00	0.03	0.03	100.00	0.56[bc]
Hybrid[c]	8,852	18	0.06	0.13	0.06	0.10	−0.07	0.18	47.42	2.78[ac]
Structure of first-year seminar										
Stand-alone course	107,721	140	0.12	0.14	0.12	0.12	−0.03	0.28	26.69	2.21
Part of a learning community	35,365	30	0.10	0.11	0.10	0.10	−0.03	0.22	27.07	
Course instructor										
Faculty or administrator	129,412	136	0.12	0.12	0.12	0.11	−0.01	0.26	27.54	6.03
Students involved	18,800	27	0.03	0.10	0.03	0.06	−0.05	0.11	59.88	
Instructor training										
Provided	93,074	90	0.11	0.09	0.11	0.06	0.03	0.18	51.32	1.66
Not provided or unknown	76,592	105	0.12	0.16	0.12	0.14	−0.06	0.30	21.65	
Grading system										
A to F	82,850	111	0.12	0.14	0.12	0.12	−0.04	0.27	27.08	0.44
Pass/fail	37,983	29	0.11	0.07	0.11	0.05	0.05	0.18	54.64	
Target population										
Academically underprepared	7,219	24	0.03	0.20	0.03	0.16	−0.18	0.24	33.37	3.58
All first-year students	162,447	171	0.12	0.12	0.12	0.10	−0.01	0.25	29.55	

(continued)

TABLE 3. (continued)

Categorical moderators	N	k	d_{obs}	SD_{obs}	δ	SD_{δ}	80% CV LL	80% CV UL	Artifact variance	z
Type of institution										
Private	4,125	24	0.21	0.25	0.21	0.20	−0.04	0.46	37.77	3.06
Public	165,541	171	0.11	0.12	0.11	0.10	−0.02	0.24	28.97	
Type of institution										
2-year	5,839	18	0.19	0.19	0.19	0.15	−0.01	0.38	35.07	2.84
4-year	163,827	177	0.11	0.12	0.11	0.10	−0.02	0.24	29.31	
Definition of participants										
First-year seminar enrollees	146,871	145	0.12	0.12	0.12	0.10	−0.01	0.24	29.91	0.97
First-year seminar completers	22,795	50	0.10	0.18	0.10	0.15	−0.09	0.29	28.15	
Publication source										
Peer-reviewed	67,660	68	0.11	0.08	0.11	0.05	0.04	0.18	57.65	1.13
Non–peer-reviewed	102,006	127	0.12	0.15	0.12	0.13	−0.05	0.28	23.35	
Study design										
Randomized experiment[d]	542	4	0.08	0.04	0.08	0	0.08	0.08	100.00	0.82[de]
Ex post facto using matching[e]	7,445	19	0.16	0.15	0.16	0.11	0.02	0.29	47.39	1.86[ef]
Ex post facto without matching[f]	161,679	172	0.11	0.12	0.11	0.11	−0.02	0.25	27.77	0.34[df]

Note. k = number of unique studies; d_{obs} = sample size weighted mean observed effect size; SD_{obs} = standard deviation of sample size weighted observed effect sizes; δ = sample size weighted mean effect size; SD_{δ} = standard deviation of effect sizes after removing variability due to sampling error; CV = credibility interval; LL = lower limit; UL = upper limit; artifact variance = estimate of the proportion of observed variance (%) in effect sizes that is due to sampling error; $z = z$ score comparison of effect size based on Fisher r-to-z transformation. $p < .01$ (one-tailed) when z score > 2.33.
[a,b,c]Superscripts denoting which pair of seminar types is being compared. [d,e,f]Superscripts denoting which pair of study designs is being compared.

observed at public institutions. However, only limited data from nine private institutions were available, and this effect should also be interpreted with some caution. In support of Hypothesis 10, first-year seminar effectiveness was higher for peer-reviewed studies than for studies described in non–peer-reviewed publications—suggesting a possible file-drawer effect. Finally, although we specified no a priori hypothesis, effectiveness was higher when using randomized experiments for first-year seminar evaluation rather than using ex post facto designs with matching on variables reflecting academic aptitude or using ex post facto designs without matching. Although this observed medium effect size (Cohen, 1988) for randomized experiments is encouraging, it is important to note that this mean effect size was also characterized by a relatively wide 80% credibility interval such that the generalizability appears to be relatively low.

For the 1-year retention rate criterion, somewhat different moderation effects were observed as 5 out of the 11 examined categorical moderators were significant. Although we specified no a priori hypothesis, extended orientation seminars were more effective than hybrid seminars providing some orientation content. In further support of Hypothesis 3A, first-year seminars were more effective when instructors were faculty or administrative staff rather than when taught in part by students. Contrary to Hypothesis 6A, first-year seminars were less effective for academically underprepared students than when targeted at all incoming first-year students. In further support of Hypothesis 8A, mean first-year seminar effectiveness was higher at 2-year institutions than at 4-year institutions—although the earlier caveat about limited data from 2-year institutions also applies to the 1-year retention rate criterion. Hypothesis 8C was again not supported as first-year seminars were significantly more effective at private institutions than at public institutions.

Continuous Moderator Analysis

Results for the continuous moderator analysis are presented in Table 4. For the first-year GPA criterion, five out of the eight examined continuous moderators were significant. Contrary to Hypothesis 4, first-year seminar effectiveness was negatively associated with the length of the seminar. That is, shorter first-year seminars were, on average, more effective than longer first-year seminars. In support of Hypothesis 6B, first-year seminar effectiveness was negatively associated with the proportion of first-year students residing on-campus. That is, first-year seminars were more effective at institutions with a greater proportion of first-year students residing off-campus than at institutions with a lesser proportion of first-year students residing off-campus. Although there were no a priori hypotheses made, first-year seminar effectiveness was also negatively associated with the size of the institution and with the proportion of the student population that was composed of White students. That is, first-year seminars were more effective at smaller institutions and at institutions with fewer White students. For the 1-year retention rate criterion, only Hypothesis 6B was supported as effectiveness was negatively associated with the proportion of first-year students residing on-campus. First-year seminar effectiveness was also negatively associated with the size of the institution.

TABLE 4

Moderator analysis for individual continuous moderators

Continuous moderators	*r*	*p*	*N*	*M*	*SD*
First-year GPA					
Length of seminar (hours of instruction)	−.35	<.01	84	27.00	11.60
Length of seminar (number of credits)	−.32	<.01	84	1.74	0.82
Size of institution	−.33	<.01	70	17090.91	8968.55
Acceptance rate	.30	.09	32	74.19	19.60
Student ethnicity (% White)	−.50	<.01	54	78.41	11.69
First-year student residence (% on-campus)	−.57	<.01	22	44.55	40.49
Year of publication	.19	.07	89	1996.40	8.65
Year of treatment	.14	.21	88	1991.05	8.28
1-year retention rate					
Length of seminar (hours of instruction)	.06	.45	184	29.11	13.22
Length of seminar (number of credits)	.05	.43	184	1.95	0.90
Size of institution	−.32	<.01	152	15927.24	10254.60
Acceptance rate	.12	.29	82	75.18	16.70
Attrition rate	.16	.03	195	29.36	14.25
Student ethnicity (% White)	−.17	.04	149	74.99	15.02
First-year student residence (% on-campus)	−.39	<.01	74	44.57	38.33
Year of publication	.02	.74	195	1999.89	6.42
Year of treatment	−.04	.63	193	1994.74	7.85

Note. GPA = grade point average. *r* is based on regressing effect size onto each individual moderator using inverse of effect size as weight.

Moderator Analysis Using Multiple Regression

The intercorrelations among the various first-year seminar characteristics, institutional characteristics, and study characteristics indicate that many of the potential moderator variables were confounded with each other (e.g., $r = -.69$ between size of institution and seminar instructor for the first-year GPA criterion). These types of covariation among moderator variables suggest the need to use multiple regression to better examine the unique effects of each potential moderator variable. Moderation results using WLS regression for the first-year GPA and the 1-year retention rate criteria are presented in Table 5 and Table 6, respectively. Because of the reduced sample size available for this analysis and because we were examining unique effects (i.e., controlling for all other independent variables), we used an alpha level of .05 to interpret effects.

For the first-year GPA criterion, the examined set of 11 moderators jointly explained 35.3% of the variation in effect sizes (adjusted $R = .59$), and five

TABLE 5

WLS regression of effect size for the first-year GPA criterion onto 11 potential moderators

Independent variables	β	*SE*	*t*	*p*
First-year seminar characteristics				
Type of seminar (0 = hybrid, 1 = extended orientation)	−0.15	0.05	−2.77	<.01
Instructor training (0 = not provided or unknown, 1 = provided)	0.00	0.05	0.01	.99
Length of seminar (hours of instruction)	−0.00	0.00	−0.96	.34
Target population (0 = all first-year, 1 = academically underprepared)	−0.03	0.06	−0.45	.66
Institutional characteristics				
Type of institution (0 = public, 1 = private)	−0.13	0.08	−1.66	.10
Type of institution (0 = 2-year, 1 = 4-year)	−0.22	0.07	−3.13	<.01
Study characteristics				
Definition of participants (0 = course enrollees, 1 = course completers)	0.02	0.06	0.27	.79
Publication source (0 = non–peer-reviewed, 1 = peer-reviewed)	0.12	0.06	2.14	.04
Year of treatment	0.00	0.00	1.08	.28
Study design (0 = not an experiment, 1 = randomized experiment)	0.41	0.15	2.70	<.01
Study design (0 = ex post facto only, 1 = ex post facto using matching)	0.17	0.05	3.30	<.01

Note. WLS = weighted least squares; *SE* = standard error; GPA = grade point average. Effective $N = 82$.

moderators explained significant amount of unique variance (at $\alpha = .05$) in effect sizes. Observed effect sizes were significantly larger when (a) the first-year seminar was a hybrid seminar (mostly a combination of extended orientation and academic seminar content in this review), (b) the first-year seminar took place at a 2-year institution, (c) the study was published in a peer-reviewed journal, and (d) the study design was a randomized experiment or an ex post facto with matching.

For the 1-year retention rate criterion, the 15 moderators jointly explained 16.4% of the variance in effect sizes (adjusted $R = .41$), and four moderators explained significant amount of unique variance (at $\alpha = .05$) in effect sizes. Observed effect sizes were significantly larger when (a) the first-year seminar was an extended orientation seminar, (b) the first-year seminar was a stand-alone course, (c) the instructors were either faculty or administrative staff, and (d) the first-year seminar was targeted at all incoming first-year students.

TABLE 6

WLS regression of effect size for the 1-year retention rate criterion onto 15 potential moderators

Independent variables	β	*SE*	*t*	*p*
First-year seminar characteristics				
Type of seminar (0 = not extended orientation, 1 = extended orientation)	0.12	0.05	2.44	.02
Type of seminar (0 = not academic, 1 = academic)	0.02	0.12	0.18	.86
Structure of seminar (0 = stand-alone course, 1 = part of a learning community)	−0.12	0.04	−3.59	<.01
Course instructor (0 = students involved, 1 = faculty or administrator)	0.12	0.04	3.22	<.01
Instructor training (0 = not provided or unknown, 1 = provided)	−0.04	0.03	−1.29	.20
Length of seminar (hours of instruction)	0.00	0.00	1.82	.07
Target population (0 = all first-year students, 1 = academically underprepared)	−0.13	0.06	−2.30	.02
Institutional characteristics				
Attrition rate	0.00	0.00	1.32	.19
Type of institution (0 = public, 1 = private)	0.10	0.08	1.27	.21
Type of institution (0 = 2-year, 1 = 4-year)	−0.00	0.09	−0.01	.99
Study characteristics				
Definition of participants (0 = course enrollees, 1 = course completers)	0.03	0.04	0.72	.47
Publication source (0 = non–peer-reviewed, 1 = peer-reviewed)	−0.08	0.04	−1.86	.07
Year of treatment	0.00	0.00	0.47	.64
Study design (0 = not an experiment, 1 = randomized experiment)	−0.14	0.22	−0.62	.54
Study design (0 = ex post facto only, 1 = ex post facto using matching)	−0.00	0.06	−0.04	.97

Note. WLS = weighted least squares; *SE* = standard error. Effective $N = 134$.

Discussion

First-year seminars are widely implemented programmatic interventions designed to assist students with their transition to college as well as their social and academic development (Young & Hopp, 2014). Our review of first-year seminar effectiveness is primarily based on ex post facto designs and should therefore be interpreted with some caution. However, the preponderance of evidence suggests that the average first-year seminar has only a very small positive effect on the first-year GPA and only a slightly stronger positive effect on the 1-year retention rate of participating students. That is, our review shows that first-year seminars have, on average, low levels of effectiveness. These findings are supportive

of past theories and findings that link academic performance to attributes that are relatively stable (e.g., personality, intelligence, academic preparedness) and hence likely to be unresponsive to short-term interventions (Kuncel, Ones, & Sackett, 2010; McAbee & Oswald, 2013). The somewhat more positive effect on retention is also in line with past theories and findings that emphasize the role of adjustment in determining retention (e.g., Credé & Niehorster, 2012). Difficulties in adjusting to college should be more mutable and responsive to interventions as they can only develop once students are enrolled.

Because of the paucity of randomized experiments in this domain, our findings regarding the average effectiveness of first-year seminars should best be thought of as representing an absence of evidence for effectiveness rather than evidence for the absence of effectiveness. This absence of evidence for effectiveness is nevertheless problematic when considering that first-year seminars have a high cost (Padgett & Keup, 2011) and are one of the primary institutional retention strategies (Noel-Levitz, 2013). Our findings may therefore appear to be disheartening to advocates of first-year seminars and college administrators. However, a closer examination of our results is more encouraging because they suggest that the effectiveness of first-year seminars can be substantially improved for both retention and academic performance.

Before we discuss the specific recommendations that we derive from our results, it is worth noting that even effects that might be classified as "small" or "weak," when using widely used rules of thumb (e.g., Cohen, 1988), can still have very important consequences. Currently, the average 1-year retention rate in institutions is only 67.6% (ACT, 2014), that is, the attrition rate in the first year of college is 32.4%. An institution with this attrition rate that implements a first-year seminar with an average effectiveness observed in this review (i.e., $d = 0.11$) would see a reduction in their attrition rate to approximately 27.4%. This represents a 15.4% reduction in the proportion of students dropping out before reaching the second academic year. For a medium-sized university with 3,000 first-year students, this would represent 150 more students persisting to the second year. These 150 students (as well as their parents and faculty) are unlikely to find the effect trivial.

In addition to retention, organizations using results criteria (i.e., reflecting training utility) to evaluate the effectiveness of training programs often examine changes in revenue. Educational institutions can calculate the estimated revenue resulting from increases in the 1-year retention rate (or decreases in the 1-year attrition rate) using a worksheet by Levitz, Noel, and Richter (1999). The estimated gains in net revenue from retaining these 150 students to the second year is $417,750 at a public baccalaureate institution and $694,650 at a private baccalaureate institution.[2] Furthermore, even a small positive effect on the first-year GPA may significantly reduce the number of students placed on academic probation for falling below a predetermined GPA threshold (Sidle & McReynolds, 2009).

Recommendations for Increasing Retention

The results of our moderator analyses suggest four practical steps that the directors of first-year seminars can take to increase the positive effect on the 1-year retention rate of participating students. First, first-year seminars should

have an orientation focus (i.e., extended orientation seminar) rather than an academic focus (e.g., academic seminar). That is, the main objective of the first-year seminar should be helping students adjust academically and socially while also fostering an attachment to the institution—rather than the development of specific academic competencies. This finding that retention is enhanced by first-year seminars that focus on facilitating adjustment is particularly supportive of theories of student retention that stress the importance of adjustment (e.g., Astin, 1993; Tinto, 1993) in a student's decision to remain in school.

Second, first-year seminars are more effective when instructors are selected from the ranks of faculty and administrative staff and do not include students. Almost 25% of the first-year seminars in our review had undergraduate or graduate student instructors teaching independently or teaching as part of a team (i.e., with faculty or administrative staff). These first-year seminars were, on average, significantly less effective.

Third, our results indicate that limiting first-year seminars to only students deemed to be academically underprepared because of their academic profile is problematic for reasons that extend beyond the somewhat crude dichotomization of the college preparedness construct. Specifically, first-year seminars are more effective when they are extended to include all incoming first-year students—not just students deemed to be academically underprepared due to their admissions profile. The 15.5% of first-year seminars in our review that only targeted academically underprepared students were significantly less effective (after controlling for other variables) than seminars that focused on all incoming first-year students. This finding is in line with findings that retention is best predicted by adjustment to college (Credé & Niehorster, 2012) rather than high school grades or admissions test scores—and that a majority of attrition occurs for nonacademic reasons (Rummel et al., 1999). Indeed, because of the powerful effect of adjustment on retention and because of the relative independence of academic preparedness from many types of adjustment (Credé & Niehorster, 2012), it may be worthwhile to consider almost all first-year students to be underprepared. Efforts to improve adjustment are also likely to accrue to students who appear to be academically prepared for college.

Fourth, the results of our moderator analyses indicate that, contrary to our expectations, first-year seminars are less effective at increasing retention (after controlling for other variables) when they are part of a learning community than when they are stand-alone courses. The defining feature of learning communities is the curricular integration across courses that provides opportunities for collaborative learning and various cocurricular activities (Price, 2005). We speculate that the learning communities in this review lacked, on average, the necessary curricular integration required to reach the levels of student engagement and institutional commitment that are critical for student retention (Lotkowski et al., 2004).

Thus, the results of our moderator analyses suggest that first-year seminars are, on average, most effective at increasing the 1-year retention rate when they are (a) an extended orientation seminar rather than an academic or a hybrid seminar, (b) taught by faculty or administrative staff rather than taught in part or in whole by undergraduate or graduate students, (c) targeted at all incoming first-year students

rather than just academically underprepared students, and (d) a stand-alone course rather than linked to a learning community. Jointly, these four characteristics are estimated to increase the effectiveness of a first-year seminar by an effect size difference of $d = 0.49$ (after controlling for other variables) relative to an academic seminar, taught by undergraduate or graduate students, targeted at academically underprepared students, and linked to a learning community. This increase in effectiveness for retention is medium in size according to common effect size conventions (Cohen, 1988), but practically very large when considering the resulting expected gains in revenue (Levitz et al., 1999).

Recommendations for Increasing Academic Performance

Our evidence-based recommendations for maximizing the positive effect of first-year seminars on first-year grades are less complex. Specifically, our moderator analyses indicates that first-years seminars should have an academic component (e.g., hybrid seminar that includes academic content) rather than an orientation focus (i.e., extended orientation seminar). We should note that the observed effectiveness of hybrid seminars for grades is very similar to the observed effectiveness of extended orientation seminars for retention.

Our results also indicate that first-year seminars are more effective when offered at 2-year institutions than at 4-year institutions. We speculate that this effect is likely due to the greater proportion of academically underprepared students at 2-year institutions (based on an open admissions policy) who stand to benefit more than students with higher levels of academic preparedness at 4-year institutions.

The joint effect of these two factors on first-year seminar effectiveness is that hybrid seminars at 2-year institutions are estimated to increase first-year grades by an effect size difference of $d = 0.36$ (after controlling for other variables) relative to extended orientation seminars at 4-year institutions. This increase in effectiveness for first-year grades is moderate in size using effect size conventions (Cohen, 1988), but practically very large when considering the resulting positive effect on retention and the expected gains in revenue (Levitz et al., 1999).

Implications for Institutions and First-Year Seminar Advocates

First-year seminars are perhaps the most frequently assessed curricular intervention in American institutions of higher education (Padgett, Keup, & Pascarella, 2013). Despite the extensive accumulated literature and to the best of our knowledge, our study is the first meta-analytic review of the overall effectiveness of first-year seminars. Our findings provide evidence that suggests that the average first-year seminar has only a small positive effect on the 1-year retention rate and even a weaker positive effect on the first-year GPA of participating students. Importantly, the effectiveness of first-year seminars for both criteria can be substantially increased based on our specific recommendations derived from the moderators of first-year seminar effectiveness.

An increase of any size, however, in the 1-year retention rate or the first-year GPA of participating students may be deemed highly significant for educational institutions and advocates of first-year seminars alike. The attrition rate is highest between the first and second years of enrollment as more than 50% of students

who drop out do so before the start of their second year (Upcraft et al., 2005). Thus, the 1-year retention rate can be used to estimate the graduation rate of an incoming cohort after the first year (Levitz et al., 1999) and is highly predictive of an institution's graduation rate (Hosch, 2008). The first-year GPA is also a strong indicator of students' likelihood of degree attainment (Hosch, 2008). That is, students with a cumulative first-year GPA below 2.0 are highly unlikely to graduate as compared to students with a cumulative first-year GPA of 2.0 or higher (Venit, 2014). Therefore, the observed small positive effect of the average first-year seminar on the 1-year retention rate and the first-year GPA of participating students is significant for educational institutions because of the expected increase in graduation rates and the resulting fiscal effects (e.g., decreases in recruitment costs, increases in net revenue).

Returning to our earlier example, an institution with 3,000 first-year students and a 1-year retention rate of 67.6% (or conversely a 1-year attrition rate of 32.4%) that implements a first-year seminar with an average effectiveness observed in this review would have 150 more students persisting to the second year. Using the assumption that 70% of these students who persist to the second year (i.e., 105 students) will go on to complete their senior year (i.e., the fourth year of study; Levitz et al., 1999), the estimated gains in net revenue from retaining these 105 students to graduation is $3,099,427 at a public baccalaureate institution and $5,154,581 at a private baccalaureate institution (see Note 2).

The lack of funding is the main reason cited by the small proportion of institutions that do not currently offer a first-year seminar (Young & Hopp, 2014). Although staffing and training expenses can make first-year seminars a costly training program (Padgett & Keup, 2011; Young & Hopp, 2014), first-year seminar directors can weight and justify these costs against the excepted gains in institutional graduation rates that are associated with even small increases in the retention and academic performance of participating students. Given the current poor economic climate surrounding higher education, the increased dependence on retention revenue at public institutions (State Higher Education Executive Officers, 2014), and the cost effectiveness of retention strategies over recruitment efforts (Cuseo, n.d.; Schuh & Gansemer-Topf, 2012), even an intervention program with a small effect on retention and grades may be justified for institutional funding based on the expected high return on investment.

Implications for Future Research and Limitations

Our meta-analytic review was able to estimate the average effectiveness of first-year seminars and identify moderators of effectiveness that should help institutions design maximally effective first-year seminars, but we remain uncertain as to why so many first-year seminars are largely ineffective. Design characteristics (e.g., material covered, nature of instructors, target audience) clearly play some role, but other variables that relate more to the process by which first-year seminar participation is linked to desirable outcomes are also likely to be important. Findings from the training literature (e.g., Kraiger, 2003) suggest some possibilities: (a) students may not be learning the material that is being presented; (b) students may be unable or unwilling to apply newly acquired knowledge, skills, or abilities; or (c) students may be unable to maintain newly acquired knowledge, skills, or abilities

over the course of a year because of the inability to practice their application or resorting to previously established habits.

Unfortunately, relatively fewer researchers have examined outcomes other than grades and retention. Expanding our examination to include both reaction criteria (i.e., reflecting students' impressions and feelings about the first-year seminar) and learning criteria (i.e., reflecting how much students learn while in the first-year seminar) would allow the field to develop a better understanding of why some first-year seminars fail to have an effect on grades and retention, whereas others have a relatively large effect. With respect to examining reaction criteria, we encourage researchers to focus more on utility reactions reflecting the perceived usefulness of the first-year seminar for academic success rather than affective reactions reflecting satisfaction with the first-year seminar. As observed by Alliger, Tannenbaum, Bennett, Traver, and Shotland (1997), utility reactions have a stronger relationship with behavior criteria (e.g., academic performance) than affective reactions that are mostly unrelated to other training effectiveness criteria.

Meta-analytic reviews are always limited by the nature and quality of the data described in the literature. This review is no exception, and a number of important limitations are worth noting. First, as highlighted in the preceding section, most investigations of first-year seminar effectiveness have examined grades and retention. First-year seminars may have very substantial effects for criteria that are temporally more proximal to the first-year seminar and "softer" in nature. However, we did not examine results criteria (i.e., reflecting the utility of the first-year seminar for the institution) such as satisfaction with faculty and attitudes toward the institution or behavior criteria (i.e., reflecting how much students' performance and behavior changes after completing the first-year seminar) such as utilization of campus support services and connections with peers. As the literature on these other important outcomes develops further, future researchers should consider a meta-analytic synthesis to supplement the one presented in this article. We therefore encourage future research to focus more systematically on these alternate outcomes—because not only are these important outcomes in their own right but also because they may help us develop a greater understanding of how first-year seminars affect retention and academic performance.

Second, the reviewed literature was characterized by very few randomized experiments. This is, of course, understandable given the ethical concerns inherent in randomly excluding some students from participation in first-year seminars. However, the reliance on simple ex post facto designs (i.e., without the use of matching) further limit any causal inferences. We therefore encourage researchers evaluating first-year seminar effectiveness to take greater advantage of ex post facto designs using matching on variables known to affect academic performance and retention (e.g., admissions test scores, high school grades)—at least as much as is feasible.

Third, we were unable to investigate possible interaction effects among the various examined moderators because the moderate size of our database would have left such an analysis underpowered. Many such interaction effects may have great practical and theoretical importance (e.g., possible interactions between institutional characteristics and first-year seminar characteristics as moderators of

effectiveness). As the literature on first-year seminar effectiveness grows, an examination of interaction effects may become feasible in the future.

Finally, we encourage researchers to further explore whether some students benefit more from first-year seminar participation than others. This research could focus on a wide variety of plausible individual differences as moderators of the effect of first-year seminars. Evidence from some studies (e.g., Simmons, Wallins, & George, 1995) suggests that students characterized by poor high school grades but high admissions test scores benefit the most. Further work, however, is needed in this area because institutions may wish to target their first-year seminars more narrowly to those students who stand to gain the most benefit (e.g., students with poor academic attitudes).

Notes

[1]Many studies that used ex post facto designs did examine differences in admissions test scores and HSGPA between first-year seminar participants and nonparticipants and typically found small or no significant difference (e.g., Babbitt, 2007).

[2]Figures are calculated using the assumptions of $7,000 for the cost of tuition, 15% for the tuition discount rate, and $6,105 for state appropriations per full-time equivalent student at a public baccalaureate institution, and $28,500 for the cost of tuition and 35% for the tuition discount rate at a private baccalaureate institution.

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