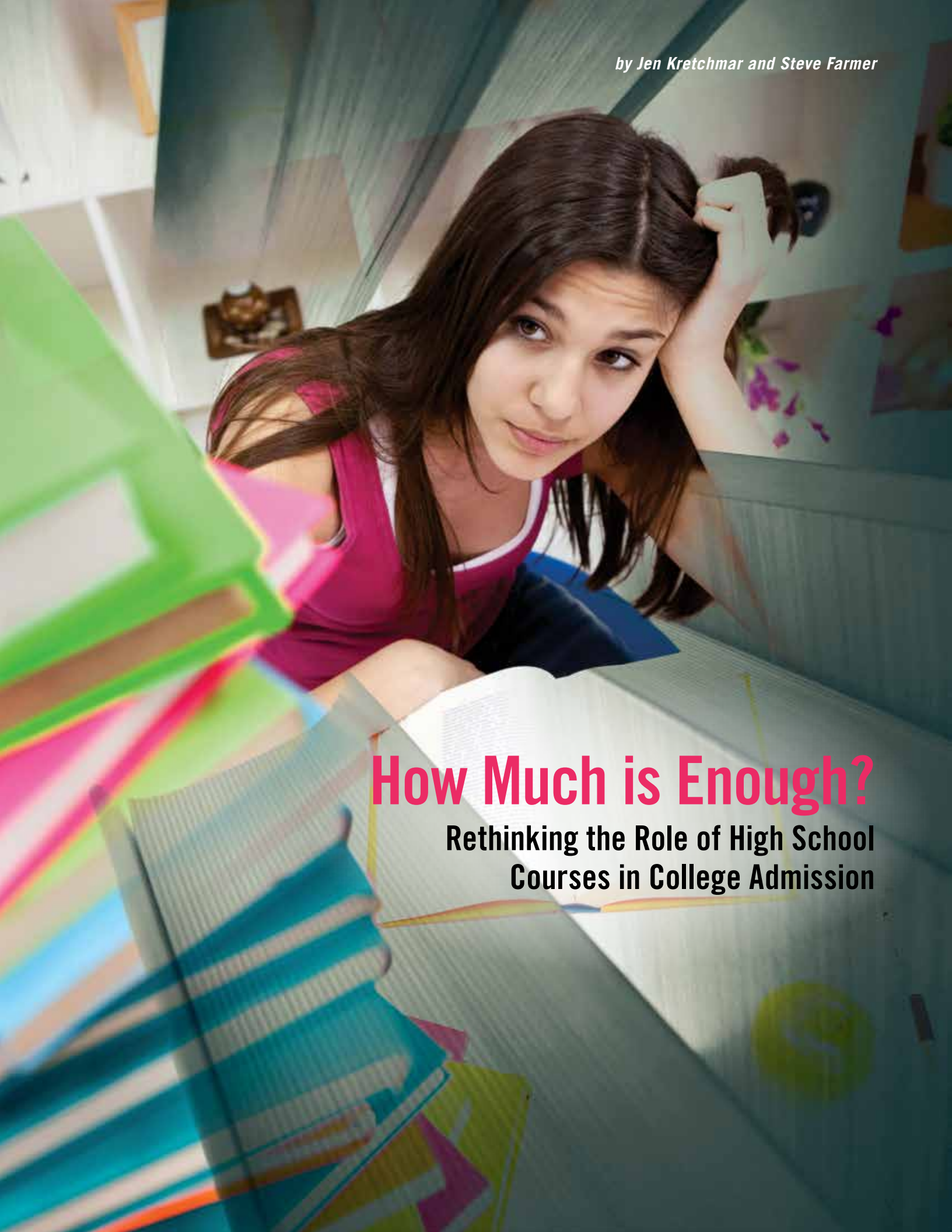
by Jen Kretchmar and Steve Farmer



How Much is Enough?

Rethinking the Role of High School Courses in College Admission

At many of the college and universities that attract the most applicants, the high-school course of study is a critical component of the evaluation. Many schools advise their candidates that they must take the most difficult course of study available at their high schools to have a chance of earning admission. Students can feel intense pressure to take more Advanced Placement (AP), International Baccalaureate (IB) and dual enrollment (DE) courses than they can handle, sometimes even more during their senior year of high school than they will take at any one time in the elite colleges to which they seek admission. As a result, many students engage in the practice of extreme programming—taking 10, 15 and sometimes as many as 20 college-level courses during their high-school careers. To maximize the number of college-level courses they take, these students sometimes sacrifice other activities that might arguably make them better students and their lives more enjoyable and fulfilling. They can also come to their colleges and universities exhausted and unprepared for the challenges and opportunities they will face.

In response, students, parents and counselors are asking: *How much is enough?* The Office of Undergraduate Admissions at the University of North Carolina (UNC) at Chapel Hill recently attempted to answer this question by examining the relationship between the number of college-level courses taken during high school by our enrolling first-year students and the cumulative grade-point average earned by these students after their first year of study at the university.

Why have many universities adhered to the philosophy that "more is better" where strength of curriculum is concerned—that a high-school program of seven AP, IB or DE courses is necessarily better than a program of six, or a program of 13 necessarily better than a program of 12, *ad infinitum*? Not because we've wanted to make life difficult for students and not because we've intended to create another hoop for them to jump through, but because we have been operating in good faith on an assumption that most of us in the admission profession believed to be true: taking more college-level courses in high school prepares students to do better once they get to college. That belief, in fact, was part of the original intention of the International Baccalaureate and Advanced Placement programs, as well as the dual-enrollment programs that are now commonplace across the country (Geiser and Santelices, 2004; Sadler, 2007). Over time, however, all of us—universities, parents, teachers, counselors, and students alike—have perhaps lost sight of the original purpose of these programs, and high-school rigor has instead become less about preparing for college and more about comparing students to one another and using the comparison to decide who gets in. Few of us have thought to stop and ask whether there might be a point of diminishing returns—is a student who takes 15 college-level courses really better prepared than someone who takes eight—and whether the costs of the behavior we're encouraging are worth the benefits.

Thus, while this study is primarily about the relationship between high-school curriculum and college performance, it also speaks to a larger issue in college admission, that of our responsibility to examine methodically our own assumptions, however benign and well-intentioned they might seem. In our profession, perhaps more than in others, practices have been handed down to us over the years, many of them more or less untested. And if and when they are finally put to the test, the results don't often reach those of us on the front lines. As Sadler (2006) writes in *A Critical Examination of the Advanced Placement Program*, "in education there is far too little useful feedback… for those who are trying to best prepare students for success. Researchers tend to communicate more clearly with their academic colleagues… than to the practitioners and policy makers who have more direct impact on schools, teachers, and students" (p. 264). Thus, while the results of this study aren't generalizable to other populations of students and although we undertook this research so that we could change, if necessary, our own admission policies and practices, we also hope to contribute to a growing conversation about how we can all best prepare students for college and fairly evaluate their candidacy for admission once they apply.

Previous Research

In their 2006 summary of research on the AP program and student outcomes, the College Board (Ewing, 2006) acknowledges that little research has examined the relationship between participation in AP courses and college outcomes. Rather, the majority of research on the AP program has focused on exam participation and course grades in relation to college performance (Burnham & Hewitt, 1971; Dodd, Fitzpatrick, De Ayala, & Jennings, 2002; Morgan and Crone, 1993; Morgan and Ramist, 1998). As more students have pursued extreme high-school programs, however—programs of as many as 20 college-level courses—and as more

scholars and professionals have recognized a disconnect between the original intention of AP, IB and dual-enrollment programs and their current use—that is, a shift away from helping students earn college credit and prepare for the rigors of college coursework toward using it primarily as a criterion in admission decisions—concern and interest have grown. As Geiser and Santelices (2004) argue, this shift is problematic for a number of reasons: because some students, in particular underrepresented minority students and students from disadvantaged backgrounds, have less access to college-level courses; undue pressure is being put on schools to offer more college-level courses than they can realistically support; and perhaps most important, the predictive validity of course participation itself has never been established.

The few studies that have investigated the relationship between course participation and college performance have led to somewhat mixed results. In a study conducted on behalf of the US Department of Education in 1999, Adelman found that the academic intensity of a student's high school curriculum was highly predictive of college completion; in the study, the number of AP courses taken was one component of a composite variable representing the intensity of the high-school curriculum. Many have cited Adelman's study as evidence for the "more is better" philosophy. Others, however, have taken issue with the study's conclusion, arguing its results have been repeatedly misinterpreted. Klopfenstein and Thomas (2006) write that "Adelman finds a rigorous high school curriculum, of which AP is one component, is an important factor in obtaining a bachelor's degree. He does not find that AP participation alone contributes to bachelor completion" (p. 6). Adelman replicated his study in 2006 partly to address the misreading of his original research. In the second study, he disaggregated the curriculum intensity variable into its various components; the number of AP courses taken was included in the model as a three-level categorical variable, including zero AP courses, one to two AP courses and three or more AP courses. The results showed that the number of AP courses taken was *not* a significant predictor of college completion.

In what is the largest study to date, Geiser and Santelices (2004) examined the role of college-level and other honors courses in predicting college performance for four cohorts of students who entered the University of California system between the fall of 1998 and 2001. They investigated course participation in relation to several outcome variables—first- and second-year GPA and first- and second-year college persistence—while controlling for academic and socioeconomic variables such as high school GPA, SAT I and SAT II subject scores, AP exam scores, academic major, and parent education. They ultimately concluded that "while AP exam scores are strongly related to college performance… merely taking AP or other honors-level courses in high school is not a valid indicator of the likelihood that students will perform well in college"(p. 19). The authors suggested that institutions may need to reconsider the use of AP, IB and DE courses as a criterion in "high stakes admissions."

In a response written by Camara and Michaelides (2005), the College Board challenged Geiser's and Santelices' findings, citing several methodological flaws. First, they criticized the study for failing to report correlations between predictor variables; because number of college-level courses is expected to be highly correlated with most if not all of the other variables in their model, its contribution may have already been accounted for by the other predictors. The "effect" of college-level courses, for example, may already be included in the SAT variable, because taking such courses might in fact lead to higher scores. The College Board provided a second possible explanation for the results. Students who take more college-level courses in high school may take more challenging courses in their first year of college, thereby deflating their GPA, especially when compared to classmates who take fewer college-level courses in high school and fewer advanced courses in their first year of college; the Geiser and Santelices (2004) study, they point out, didn't attempt to control for the difficulty level of first-year college courses. At the same time, however, even as Camara and Michaelides (2005) defended the possibility that more college-level courses in high school might lead to better grades in college, they also offered the following qualification: "The relationship between number of advanced-level courses and college grades may not be linear; is it reasonable to expect as much difference between a student with five such courses and a student with 10, as with a student with no such courses and a student with five?" (p. 3)

Given the limited research on this topic, in combination with the high costs associated with not having a clearer understanding of the relationship between course participation and college success—costs primarily incurred by students themselves—we attempted to contribute to this growing body of literature by examining this relationship for our own students. We also addressed some of the shortcomings of previous research.

Methodology

Using the cohort of students who entered UNC–Chapel Hill as first-year students in 2010, we modeled first-year GPA as a function of high school grades, SAT and number of college-level courses taken during high school. Our final sample included 3,626 students.

SAT and high school grades were included in the analysis as control variables. The SAT variable was a combined total of the math and critical reading sections of the exam; if students reported an ACT, the SAT equivalent score was used instead. Application readers coded high school grades on a 1–10 scale, with 10 representing the best grades in the applicant pool and 1 representing the poorest grades in the applicant pool; the resulting variable was referred to as the academic performance

rating. The academic program rating was a simple count of all college-level courses, including Advanced Placement, International Baccalaureate and dual enrollment; academic program was included in the model as a nominal variable. Means and standard deviations for variables used in the analysis are presented in Table 1. Importantly, there was significant variability in the number of college-level courses taken in high school by students in the sample, with a mean of 7.51 and a standard deviation of 3.05, and a 0–20 range.

by entering first-year students, most were category 1 courses (n=30,350). Only 5,764 and 628 were category 2 and category 3 courses, respectively. Given that most entering first-year students were taking category 1 courses, and because the different categories were only a rough approximation of course difficulty, we collapsed our analysis into a single model of the relationship between FYGPA across *all* college courses and the number of college-level courses taken during high school, while controlling for SAT and high school grades.

Why have many universities adhered to the philosophy that "more is better" where strength of curriculum is concerned… Not because we've wanted to make life difficult for students, and not because we've intended to create another hoop for them to jump through, but because we have been operating in good faith on an assumption that most of us in the admission profession believed to be true: that taking more college-level courses in high school prepares students to do better once they get to college.

Table 1. Means and Standard Deviations

	Mean	Std Dev
Academic Program	7.51	3.05
Academic Performance	7.70	1.77
SAT (CR/V + M)	1323	121.33
FYGPA	3.17	0.57

The correlations between the predictor and control variables and first-year-GPA are shown in Table 2. We included testing and high school grades in the analysis as an attempt to control for pre-existing ability of students. Although some have suggested that taking more college-level courses may improve test scores and high school grades, we found small to modest correlations between our dependent and control variables.

Table 2. Correlations

	Program	Performance	SAT (CR + M)	FYGPA
Program	--			
Performance	-0.039	--		
SAT (CR + M)	0.199	0.220	--	
FYGPA	0.106	0.395	0.355	--

Finally, we attempted to control for course difficulty by grouping courses into three different categories based on the university registrar's course numbering system. Courses were either coded as introductory undergraduate courses (category 1), intermediate undergraduate courses (category 2) or advanced undergraduate/graduate level courses (category 3). Of the 36,744 courses taken

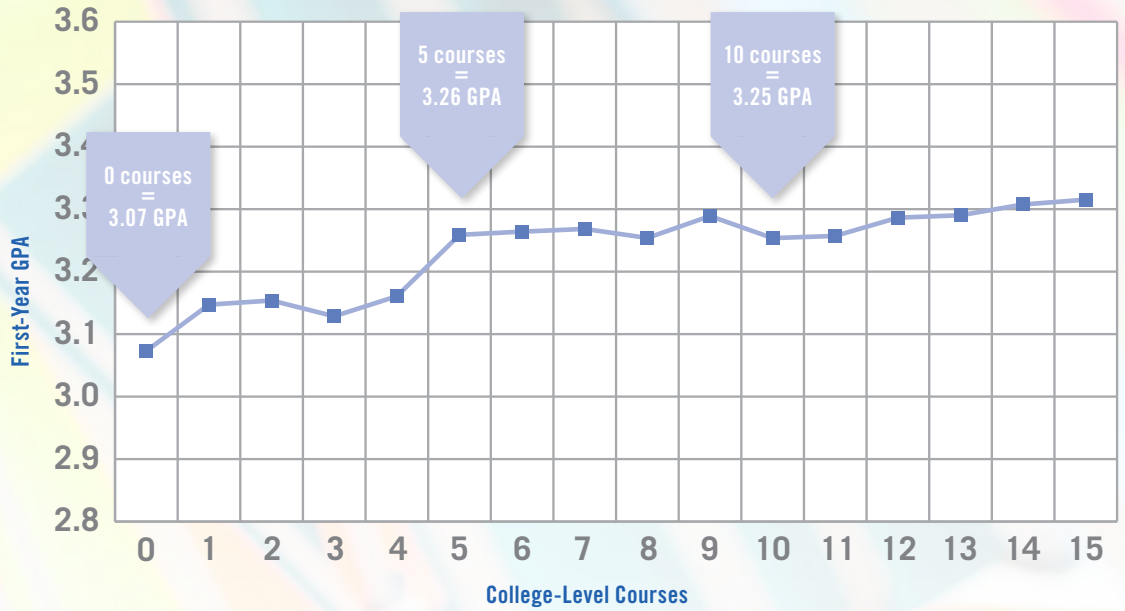
Results

Graph 1 (page 32) depicts the relationship between number of college-level courses taken in high school and modeled first-year college GPA; because less than two percent of students in the sample took more than 15 college-level courses in high school, the tail end of the distribution is not included. The graph shows a strong association between FYGPA and college-level courses when the number of college-level courses taken in high school ranges 0–5. On average, after controlling for SAT and high school grades, a student who takes no college-level courses during high school earns a 3.07 GPA in their first year of college at UNC–Chapel Hill, compared to a student who takes five and earns, on average, a 3.26. For a student who takes more than five college-level courses, however, the incremental gains in FYGPA are much smaller or even null. A student taking 10 college-level courses during high school, for example, earns on average the same FYGPA—a 3.25—as a student taking five college-level courses. In other words, the results suggest that our students need to take some college-level courses in high school to prepare themselves for UNC–Chapel Hill, but beyond a certain point, there isn't an additional benefit in terms of grade point average.

Discussion

The results of this analysis are, at the very least, inconsistent with the more-rigor-is-*always*-better philosophy. More specifically, the data provide no evidence to support the idea that taking an *extreme* high-school program—a program that includes 20, 15 or even 10 AP, IB or DE courses—will better prepare a student for success at UNC than a strong but more modest program. At the same time, the data are consistent with the philosophy that some

Graph 1. Relationship between FYGPA and Number of College-Level Courses



rigor is better than none. Unlike previous research by Geiser and Santelices (2004), who found that "the number of AP and honors courses taken in high school bears little or no relationship to students later performance in college" (p. 1), our data suggest that students who take at least five AP, IB or DE courses typically outperform those who don't take any. However suggestive the results, there are, however, several limitations to this kind of analysis. Because the results are based on observational data—that is, students were not randomly assigned to take different numbers of college-level courses in high school—causal inferences cannot be made. The relationship can be described, even if the results don't fully explain why the relationship is occurring. Also, we were ultimately unable to control for the difficulty of courses taken by students in their first year at UNC; although more than 80 percent of all courses taken by first-year students were introductory level courses, it's still possible that those students taking more college-level courses during high school took more difficult courses in their first year at UNC as well, thereby potentially deflating their GPA.

The implications of the research—the question of what to *do* with what we now know—are arguably as challenging as the undertaking of the research itself. How do we change admission policies and practices that have been in place for decades? What criteria will we use to evaluate candidates if we place less emphasis on something as tangible as number of AP, IB and dual enrollment courses? How do we communicate the results and our changing admission policies to students, parents, teachers, and counselors? And how can we effect change for students and their families, if we are the only university that moves in this direction?

The answers to these questions for UNC are clear, yet evolving. We firmly believe that we must act on what we have learned to be true for *our* students; therefore, we will communicate to prospective students that we expect them to take at least five academic courses *each* year of high school, because that is what they will likely take in any single semester in college. In addition, we will encourage them to pursue at least five college-level courses—AP, IB or DE—throughout the entirety of their

We firmly believe that we must act on what we have learned to be true for our students; therefore, we will communicate to prospective students that we expect them to take at least five academic courses each year of high school, because that is what they will likely take in any single semester in college. In addition, we will encourage them to pursue at least five college-level courses—AP, IB or DE—throughout the entirety of their high school careers…

high school careers, because our research suggests that will best prepare them for success at UNC. If they've met that threshold, they can trust that their curriculum will be an asset to them in their competition for admission. At the same time, we won't discourage students from taking more college-level courses if they have a genuine interest and inclination to do so. Many may ask if our emphasis will shift toward test scores and/or extracurricular activities. And that's the part of our way forward that is still evolving. We don't want to repeat the same mistake, replacing one arms race—that of accumulating as many college-level courses as possible—with another, accumulating as many extracurricular activities as possible. We don't want to put more emphasis on test scores, only to later learn that beyond a certain threshold they too no longer correlate with performance. All of which is to say that there is a lot of work to be done—for us as an institution and for the profession as a whole—in figuring out how best to prepare students for success in college and how to fairly evaluate their candidacy. Even the best predictive models only explain about one-third of the variation in college performance; can we uncover other measures—both predictors and outcomes—that help us better assess students' potential?

In the meantime, we will encourage students to lead balanced lives and develop meaningful interests both inside and outside the classroom, because that's what we believe is best for them and what will make for more vibrant college communities. We also will continue to evaluate students as whole individuals, using everything we know about them and our institution to make the most informed and thoughtful admission decisions we can. As we continue to evaluate our own policies and practices, we hope that preparing for and applying to college will become a process that is increasingly more humane and fair for students.

JEN KRETCHMAR is the senior assistant director of research in undergraduate admissions at the University of North Carolina at Chapel Hill.

STEVE FARMER is the vice provost for enrollment and undergraduate admissions at the University of North Carolina at Chapel Hill.

REFERENCES

Adelman, C. (2006). The toolbox revisited: Paths to degree completion from high school through college. Washington, D.C.: US Department of Education.

Adelman, C. (1999). Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment. Washington, D.C.: US Department of Education Office of Educational Research and Improvement.

Burnham, P.S., & Hewitt, B. A. (1971). Advanced Placement scores: Their predictive validity. *Educational and Psychological Measurement*, 31, 939-945.

Camara, W. & Michaelides, M. (2005). AP use in admissions: A response to Geiser and Santelices. Retrieved from http://research.collegeboard.org/sites/default/files/publications/2012/7/ misc2005-1-ap-use-admissions-geiser-santelices.pdf

Dodd, B.G., Fitzpatrick, S.J., De Ayala, R.J., & Jennings, J.A. (2002). An investigation of the validity of AP grades of 3 and a comparison of AP and non-AP student groups. (College Board Research Report No. 2002-9). New York, NY: The College Board.

Ewing, M. (2006). The AP Program and Student Outcomes: A Summary of Research. Retrieved from http://research.collegeboard.org/sites/default/files/publications/2012/7/researchnote-2006-29-ap-program-student-outcomes.pdf

Geiser, S. & Santelices, V. (2004). The role of Advanced Placement and honors courses in college admissions. Berkeley, CA: Center for Studies in Higher Education, University of California, Berkeley. Retrieved from http://professionals.collegeboard.com/profdownload/the-role-of-ap-and-honors-courses-in-college-admissions.pdf

Klopfenstein, K., & Thomas, M. (2006). The link between Advanced Placement experience and early college success. Retrieved from http://www.utdallas.edu/research/tsp-erc /pdf /wp_klopfenstein_2006_link_advanced_placement.pdf.

Morgan, R., & Crone, C. (1993). Advanced Placement Examinees at the University of California: An investigation of the freshman-year courses and grades of examinees in biology, calculus AB, and chemistry. (ETS Statistical Report 93-210). Princeton, NJ: Educational testing Service.

Morgan, R., & Ramist, L. (1998). Advanced Placement students in college: An investigation of course grades at 21 colleges. (ETS Statistical Report No. 98-13). Princeton, NJ: Educational Testing Service.

Sadler, P.M. (2006). Key Findings. In Philip M. Sadler, Gerhard Sonnert, Robert H. Tai, & Kristin Klopfenstein (Eds), *A critical examination of the advanced placement program* (263-270). Cambridge, MA: Harvard Education Press.