ACT scores, high school GPA, and predictors of college success

February 23, 2016

Jeff Allen and Krista Mattern, ACT, Inc.

ACT College Readiness Benchmarks

The ACT College Readiness Benchmarks provide information on students' likelihood of being successful in typical first-year, credit-bearing courses at a *typical* college based solely on their ACT scores (Allen, 2013). One of the main benefits of the benchmarks is that they evaluate academic readiness on a standardized measure allowing for comparisons of students' educational progress at the local, district, state, and national level. On the other hand, high school GPAs are not directly comparable at the local, district, state, or national level given different grading standards across teachers, courses, and schools coupled with variability in course selection across students. Therefore, for policy purposes and tracking educational progress over time, using a standardized measure makes the most sense.

With that in mind, research clearly shows that additional measures are related to college success such as high school GPA and that models that take into account more information result in more accurate predictions than models based on single measures such as using only ACT scores or using only high school GPA (Sawyer, 2010). Moreover, research indicates that the relationship between ACT scores and high school GPA with college outcomes varies across postsecondary institutions (Allen, 2013; Sawyer, 2010; Westrick et al., 2015). Therefore, ACT encourages institutions to conduct local course placement studies to evaluate how ACT scores relate to college success on their campus as well as to examine the joint influence of test scores and other predictors (e.g., high school GPA) on college success. ACT offers a Course Placement Service to assist institutions with these analyses and provide institution-specific course placement reports. More information on ACT's Course Placement Service is available here. Research evidence supporting the use of multiple measures to better predict college success is summarized below.

High school GPA or ACT scores: Which is the stronger predictor?

High school GPA is a free and existing measure obtained through the course of a student's high school experience, while ACT scores are usually obtained through testing in 11th or 12th grade. Policymakers may then wonder if there is any benefit to using ACT scores in addition to high school GPA for various purposes. Most uses of ACT scores presume that ACT scores measure aspects of readiness that are not already captured by high school GPA or other existing measures. In this brief, we examine the question of whether ACT scores help predict college success.

Studies that employ large samples of postsecondary institutions and college students routinely find that both high school GPA and ACT scores are predictive of college outcomes. Often, the outcome of interest is first-year college GPA because it occurs in close proximity to the predictor measures and because it is a leading indicator of later outcomes, such as retention and degree attainment.

Several studies conducted by ACT report that high school GPA, not ACT Composite score, is typically the strongest predictor of first-year college GPA. For example, a meta-analysis reported typical correlations with first-year GPA of 0.38 for ACT Composite score and 0.47 for high school GPA (Table 1; Westrick et al., 2015). Observed correlations are artificially deflated due to *range restriction*, which occurs when students with certain levels of high school GPA and ACT scores are more likely to be admitted and enroll in college. After applying statistical corrections for range restriction, the typical correlations with first-year college GPA are 0.58 for high school GPA and 0.51 for ACT Composite score.

Table 1: Typical correlations with first-year college GPA

Predictor	Correlation	
	Observed	Corrected for Range Restriction
ACT Composite	0.38	0.51
HSGPA	0.47	0.58

Source: Westrick et al. (2015), median correlations across 50 4-year institutions

While high school GPA is typically the stronger predictor of first-year GPA, the results in Table 1 indicate that the difference is not large. Most importantly, as we examine next, ACT scores provide information about college readiness that is not already captured by high school GPA.

Do ACT scores provide additional information about college readiness?

While research usually shows that high school GPA is the stronger predictor of first-year college GPA, the same research also shows that the *combination* of high school GPA and ACT scores provide better prediction than either measure used alone. Figure 1 demonstrates how the probability of earning a first-year GPA of 3.0 or higher depends on both high school GPA and ACT Composite score. For example, for a student with a high school GPA of 3.0:

- The probability of earning first-year GPA of 3.0 or higher is **0.24** for a student with an ACT Composite score of 15
- The probability of earning first-year GPA of 3.0 or higher is **0.66** for a student with an ACT Composite score of 30

ACT Composite score provides information about college readiness that is not captured by high school GPA.

Figure 1: Probability of first-year GPA of 3.0 or higher, by high school GPA and ACT Composite score
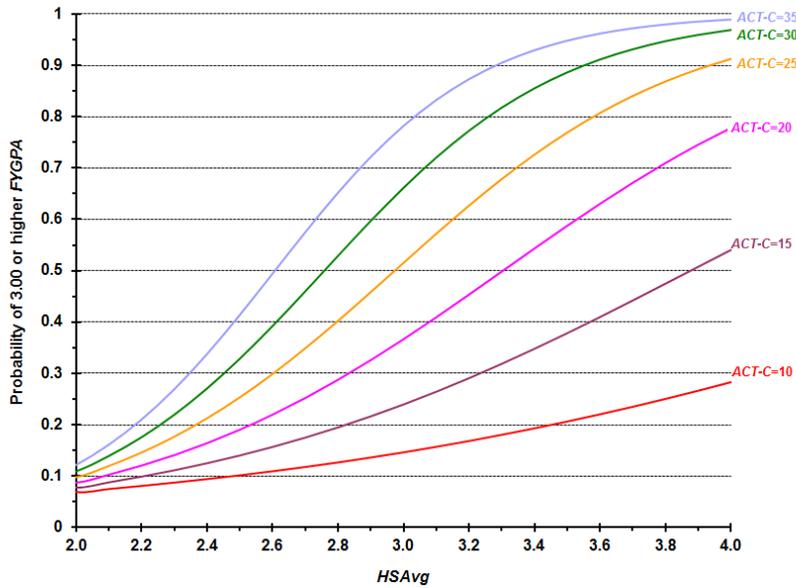
Source: Figure 4 from Sawyer (2010). n=120,338 students enrolled at 4-year institutions.

In addition to first-year college GPA, other studies have considered longer-term outcomes, such as degree attainment. Figure 2 demonstrates how the probability of earning a bachelor's degree within 6 years also depends on both high school GPA and ACT Composite score.

Figure 2: Probability of bachelor's degree completion by year 6, by high school GPA and ACT Composite score
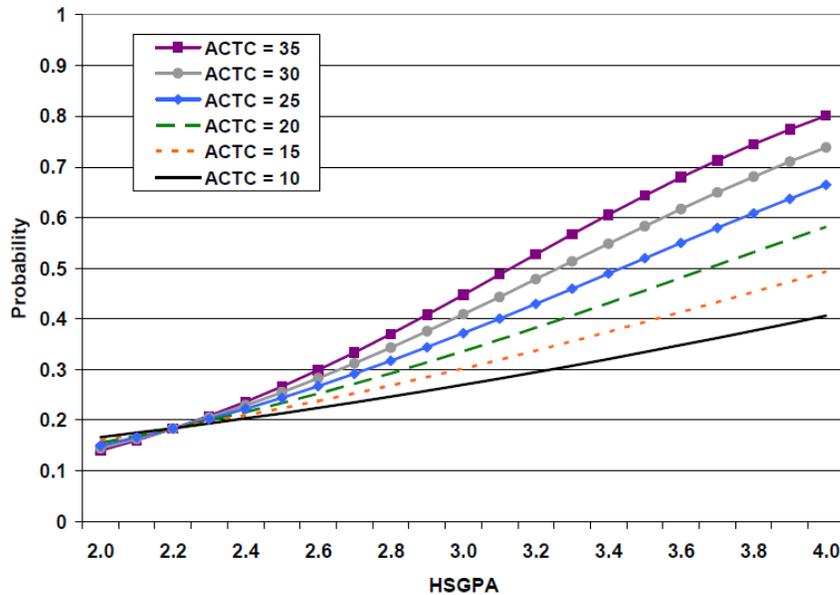
Source: Figure 2 from Radunzel & Noble (2012). n=125,911 students from 61 4-year institutions.

What about other measures of readiness?

Reflective of research showing the predictive strength of both high school GPA and ACT scores, college admissions personnel have ranked ACT/SAT scores behind only grades in college prep courses and strength of curriculum as factors of "considerable importance" in the admission decision (Clinedinst, Hurley, & Hawkins, 2011). There is growing consensus, however, that multiple dimensions of readiness exist (Mattern et al., 2014) that include both cognitive and noncognitive predictors. ACT scores and high school GPA indirectly measure some of the alternative dimensions of readiness, such as academic commitment, academic work habits, and educational planning (McNeish et al., 2015). But research has shown that additional measures of readiness help explain performance in college.

For example, in addition to high school GPA and ACT Composite score, a measure of academic motivation from ACT's Engage assessment was used in the prediction model for first-year college GPA (Table 2). The correlation measures the strength of relationship between each measure and first-year college GPA. The beta weights indicate the *incremental* prediction of each measure; that is, how much the measure contributed to the overall prediction of first-year college GPA above and beyond the other measures. Individually and collectively, all three measures were significant predictors of first-year college GPA. The weight for ACT Engage Academic Discipline score was 0.21, which is somewhat smaller than the weights for high school GPA (0.28) and ACT Composite score (0.30).

Table 2: Predictors of first-year college GPA

Predictor	Observed Correlation	Beta Weight
High school GPA	0.49	0.28
ACT Composite score	0.46	0.30
ACT Engage Academic Discipline score	0.29	0.21

Source: Table 3 and Table 5 from Robbins et al. (2006). n=6,744 students enrolled at 4-year institutions.

Summary points

- Large-scale studies usually show that high school GPA has a slightly larger correlation than ACT Composite score with first-year college GPA.
- ACT scores, in combination with high school GPA, provide stronger prediction of college outcomes than either measure alone.
- Additional dimensions of readiness exist that are not completely captured by high school GPA and ACT scores.

References

Allen, J. (2013). *Updating the ACT College Readiness Benchmarks*. (ACT Research Report Series No. 2013-6). Iowa City, IA: ACT, Inc. http://www.act.org/research/researchers/reports/pdf/ACT_RR2013-6.pdf

Clinedinst, M.E., Hurley, S.F., & Hawkins, D.A. (2011). 2011 State of College Admission. Arlington, VA: National Association for College Admission Counseling. http://www.nacacnet.org/research/research-data/documents/2011soca.pdf

Mattern, K., Burrus, J., Camara, W., O'Connor, R., Hanson, M.A., Gambrell, J., Casillas, A., & Bobek, B. (2014). Broadening the definition of college and career readiness: A holistic approach. (ACT Research Report 2014-5). Iowa City, IA: ACT, Inc. http://www.act.org/research/researchers/reports/pdf/ACT_RR2014-5.pdf

McNeish, D.M., Radunzel, J., & Sanchez, E. (2015). A multidimensional perspective of college readiness: Relating student and school characteristics to performance on the ACT. (ACT Research Report 2015-6). Iowa City, IA: ACT, Inc. http://www.act.org/research/researchers/reports/pdf/ACT_RR2015-6.pdf

Radunzel, J., & Noble, J. (2012a). Predicting Long-Term College Success through Degree Completion Using ACT ® Composite Score, ACT Benchmarks, and High School Grade Point Average. (ACT Research Report No. 2012-5). Iowa City, IA: ACT, Inc. http://www.act.org/research/researchers/reports/pdf/ACT_RR2012-5.pdf

Robbins, S., Allen, J., Casillas, A., Peterson, C., & Le, H. (2006). Unraveling the differential effects of motivational and skills, social, and self-management measures from traditional predictors of college outcomes. *Journal of Educational Psychology, 98*, 598-616. https://www.researchgate.net/profile/Huy_Le5/publication/232473747_Unraveling_the_differential_effects_of_motivational_and_skills_social_and_self-management_measures_from_traditional_predictors_of_college_outcomes/links/09e4150f580eae2733000000.pdf

Sawyer, R. (2010). *Usefulness of high school average and ACT scores in making college admissions decisions*. ACT Research Report 2010-2. Iowa City, IA: ACT, Inc. http://www.act.org/research/researchers/reports/pdf/ACT_RR2010-2.pdf

Westrick, P.A., Le, H., Robbins, S.B., Radunzel, J.R., & Schmidt, F.L. (2015) College performance and retention: A meta-analysis of the predictive validities of ACT® scores, high school grades, and SES. *Educational Assessment, 20*:1, 23-45. http://www.tandfonline.com/eprint/t5WsvRTfD4BurrpKdesv/full