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Academic Growth Patterns of First-Generation College Students in Grades 8 to 12 by Parental Education

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A recent study examined academic growth patterns for first-generation students by parent education levels, based on the ACT college and career readiness system of assessments from grades 8 to 12.[1] Across subject areas, the average ACT Explore®, ACT Plan®, and ACT® test scores increased with parent education level (Table 1).[2,3,4] First-generation students across all grade spans experienced less-than-expected growth in all subject areas. However, most of the academic growth differences were small (Figures 1–3).

- Average growth for first-generation students across all grade spans ranged from -0.52 to -0.18 in English, -0.39 to -0.15 in reading, -0.34 to -0.19 in mathematics, and -0.35 to -0.15 in science.
- Students whose parent had only some college experienced less-than-expected growth in all subject areas and across all grade spans.
- First-generation students and students whose parent had some college experience both had statistically significant (p-value < 0.01) and negative mean residual scores in all subject areas across all grade spans. Yet, the difference between their mean residual scores ranged from 0.02 to 0.07 in mathematics, 0.14 to 0.34 in English, 0.11 to 0.26 in reading, and 0.11 to 0.23 in science. This shows that the difference between first-generation students and students whose parent had some college experience was smallest in mathematics.
- Students whose parent had at least a bachelor's degree had statistically significant (p-value < 0.01) and positive mean residual scores (ranging from 0.09 to 0.79 in English, 0.08 to 0.63 in reading, 0.13 to 0.71 in mathematics, and 0.08 to 0.53 in science).
- Across all subject areas, it appears that growth differences by parental education get more pronounced overtime. That is, the mean residuals are larger in later grades, indicating that disparity is exacerbated over time, rather than closing or narrowing the achievement gap. ■

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ACT Technical Briefs provide reliability, validity, and other psychometric analyses on ACT education and workforce development assessments, services, and programs and those of its partners. For more on the ACT test, visit www.act.org.

Table 1. Summary Statistics of ACT Explore, ACT Plan, and ACT Scores[5]

			Subject Area			
			English	Mathematics	Reading	Science
Group	N	Test	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Parental Education						
No College	56,162	ACT Explore	14.7 (1.6)	15.4 (1.4)	14.4 (1.3)	16.6 (1.1)
		ACT Plan	16.6 (1.7)	17.8 (1.9)	17.0 (1.8)	18.0 (1.6)
		ACT	19.3 (2.6)	19.5 (2.2)	19.8 (2.4)	19.8 (2.1)
Some College	76,265	ACT Explore	15.3 (1.5)	15.8 (1.4)	14.9 (1.3)	16.9 (1.1)
		ACT Plan	17.2 (1.6)	18.4 (1.9)	17.7 (1.7)	18.6 (1.5)
		ACT	20.3 (2.6)	20.3 (2.3)	20.7 (2.4)	20.6 (2.1)
Bachelor's Degree	65,493	ACT Explore	16.0 (1.5)	16.4 (1.3)	15.4 (1.3)	17.4 (1.1)
		ACT Plan	18.0 (1.6)	19.3 (2.0)	18.5 (1.7)	19.3 (1.5)
		ACT	21.6 (2.7)	21.5 (2.5)	21.9 (2.4)	21.7 (2.2)
Graduate Degree	45,954	ACT Explore	16.4 (1.5)	16.7 (1.3)	15.7 (1.3)	17.7 (1.1)
		ACT Plan	18.4 (1.6)	19.9 (2.0)	18.9 (1.7)	19.8 (1.6)
		ACT	22.5 (2.8)	22.3 (2.5)	22.7 (2.5)	22.3 (2.2)

Note: Of the total sample of 281,854 students, 37,980 students (13%) didn't report their parent's education level.

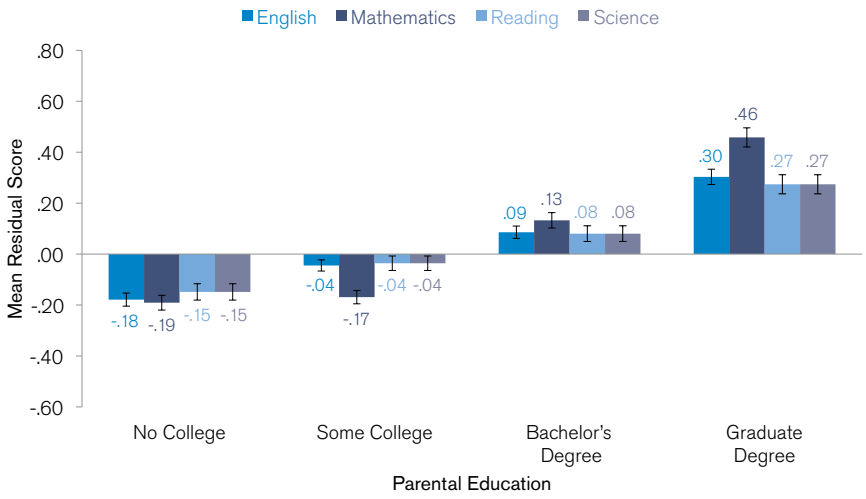

Figure 1. Mean residual scores[6] for grades 8 to 10 growth period by parental education

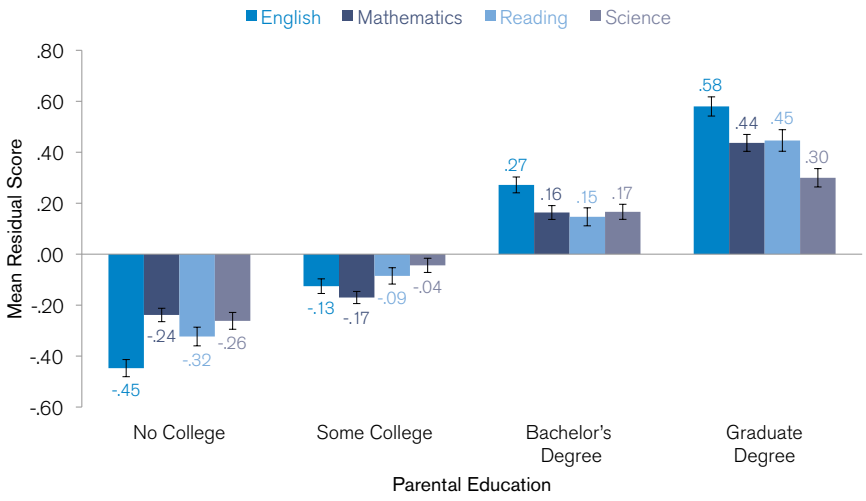

Figure 2. Mean residual scores[7] for grades 10 to 11/12 growth period by parental education

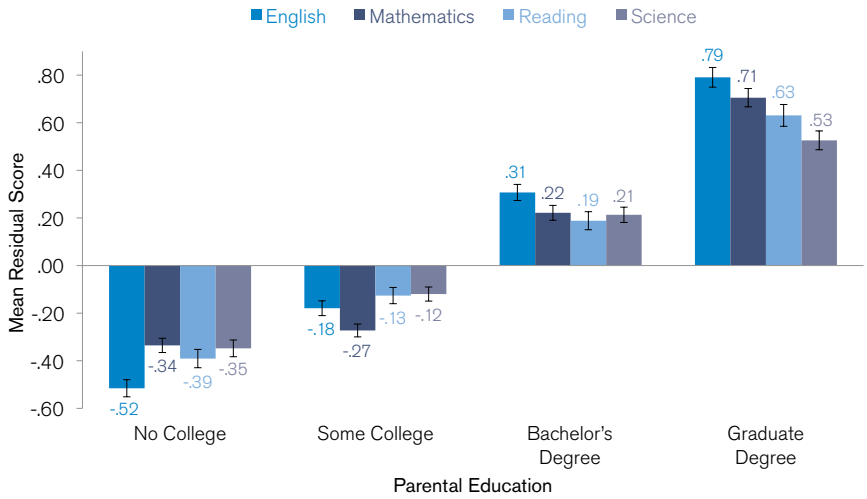

Figure 3. Mean residual scores[7] for grades 8 to 11/12 growth period by parental education

Notes

1 Bassiri, D (2016). *Academic Growth Patterns of First-Generation College Students in Grades 8 to 12* (ACT Research Report 2016-6). Iowa City, IA: ACT.

2 The average ACT Explore scores difference between first- and non-first-generation whose parents had some college experience, bachelor's degree, or graduate degree were 0.6, 1.3, and 1.7, respectively in English; 0.4, 1.0, and 1.3 in mathematics; 0.5, 1.0, and 1.3 in reading; and 0.3, 0.8, and 1.1 in science.

3 The average ACT Plan scores difference between first- and non-first-generation whose parents had some college experience, bachelor's degree, or graduate degree were 0.6, 1.4, and 1.8, respectively in English; 0.6, 1.5, and 2.1 in mathematics; 0.7, 1.5, and 1.9 in reading; and 0.6, 1.3, and 1.8 in science.

4 The average ACT scores difference between first- and non-first-generation whose parents had some college experience, bachelor's degree, or graduate degree were 1.0, 2.3, and 3.2, respectively in English; 0.8, 2.0, and 2.8 in mathematics; 0.9, 2.1, and 2.9 in reading; and 0.8, 1.9, and 2.5 in science.

5 Until 2015, the ACT college and career readiness system of assessment included ACT Explore (for 8th graders), ACT Plan (for 10th graders), and the ACT (for 11th and 12th graders). The three assessments shared a common score scale, with different score ceilings. ACT Explore scores ranged from 1–25, ACT Plan scores ranged from 1–32, and ACT scores range from 1–36. ACT Explore and ACT Plan contained multiple-choice tests in English, mathematics, reading, and science, as the ACT does. For each assessment, the Composite score is calculated as the mean of the four subject area scores. All three assessments measure academic skills necessary for education and work after high school, respective to the curriculum of the grade level for which it is intended, and use a common score scale. The ACT Aspire® assessment system has replaced ACT Explore and ACT Plan.

6 The mean residual scores represent deviations in average actual and predicted ACT Plan scores for the total group.

7 The mean residual scores represent deviations in average actual and predicted ACT scores for the total group.