Understanding Growth Models: CORE SGP as Verified Data for CAASPP
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In May 2023, The California State Board of Education designated the CORE Data Collaborative's Student Growth Percentile (CORE SGP) as a possible metric for using California Assessment of Student Progress and Performance (CAASPP) data as "verified data" in charter renewals. Charter schools are not required to pay for and provide the fee-based CORE SGP data, nor are authorizers required to consider it, if presented. However, given that CORE SGP fills a critical data need as a highly respected measure of growth on CAASPP, charter schools and authorizers may want to value it as a robust part of charter renewal data. This article discusses growth model methodologies, including why experts generally prefer growth models with characteristics like CORE SGP.

Background: Growth Models Evaluate Student Progress Relative to that of Selected Academic Peers
Growth metrics evaluate "how good" an individual student's progress is, from pre- to post-test, relative to academic peers who are "like" that student. Growth models do not use fixed growth targets that apply to all students. Rather, growth models create a custom projection of growth for each individual student by selecting like comparator students and calculating the growth made by those students. A growth metric evaluates how much better or worse that student's observed growth is relative to growth projected for the student.

Growth models select "like" comparator students based on predictive factors. To calculate projected growth for each student—how much a student could be expected to grow from pre- to post-test, growth models select academic peers for comparison. To select academic peers into the comparison group, growth models generally use the student's baseline pre-test score as a basis for selection. Baseline score is highly statistically predictive: that is, average growth rates are not the same at every baseline score but rather vary by baseline score. One assessment publisher estimated that baseline score accounts for about 70 percent of the variation observed across all students' growth rates. Using baseline score to select academic peers is the most prevalent basis for comparison. For CORE SGP, baseline score is not the only factor used to predict growth, but it is by far the most significant factor.

Growth models typically produce projected growth scores by using like baseline scores and may refine the projection by incorporating other factors that are predictive of growth. In addition to matching students by baseline score, growth models can also incorporate other factors into the projection. Growth varies somewhat—though not dramatically--based on factors that are predictive of growth such as student- or school-level characteristics. For example, given a particular baseline score, the average growth of English Learners may be slightly different from that of non-English Learners with that baseline score. Incorporating English Learner status into a student's growth projection, then, can improve the predictability of that projection. Every student has multiple characteristics that are predictive of growth. For example, for a given baseline score, the average growth of English Learners with a disability from a

low-income family may be slightly different than English Learners with that same baseline score who do not have disability and are not low-income.

Local assessments cannot incorporate learner characteristics into growth projections because the publishers do not have related data for comparator students. The CORE Data Collaborative collects the needed data, so CORE SGP can include additional controls into the growth model. These controls account for marginal differences and for many schools may make no significant difference because baseline score provides most of the model's predictiveness.

Experts on Growth Models Tend to Prefer Inclusion of Controls in the Selection of Academic Peers
Incorporating demographic characteristics does not typically have much effect on the growth scores of most schools but can provide a modest correction to the growth scores of schools in the most disparate circumstances. One might imagine that incorporating demographic characteristics would have a significant impact on a growth predictions, but, in fact, research on growth models finds little impact. Inclusion of demographics tends to refine growth models for schools in the most "disparate circumstances," such as when schools serve high concentrations of affluent students or high concentrations of students facing greater challenges. Scholars of growth models tend to find this refinement desirable:

> "There are several key questions the state might consider in deciding whether to control for student demographics in their residual-gain [growth] models. One question is whether the state is interested in comparing schools that are similar in terms of the kinds of students they serve. **Put another way, should schools be punished or rewarded based on who the children are who happen to enroll at the school, or should comparisons be based on schools' effects on those students' performance?** Similarly, should schools be compared fairly with themselves over time? For example, schools in rapidly gentrifying urban areas might quickly appear to be more effective because their student body is becoming more affluent. Controlling for student demographics would ensure schools are not benefiting from or being punished for demographic changes that are out of their control…
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> …**Most researchers who study value-added models and are concerned most about bias and the incentives inherent in choosing a model, would prefer a model that does control for students' individual and peer demographics in addition to prior test scores**. For example, Castellano and Ho (2013) argue, 'If it seems that more grades [of prior achievement data] allow for an improved definition of academic peers, then why not improve the definition further by including demographic variables?[28]' Koedel and colleagues (2015) similarly argue that 'in policy applications **it may be desirable to include demographic and socioeconomic controls in [residual-gain models], despite their limited impact on the whole, in order to guard against [schools] in the most disparate circumstances being systematically identified as over- or under-performing.**[29]'" (Polikoff, 2019)

Given the State Board's endorsement of CORE SGP and expert preference for growth models that incorporate student characteristics, CORE SGP data should be welcomed as source of growth data in charter renewal. Charter schools and authorizers may be unfamiliar with CORE SGP: lack of familiarity

tends to create hesitation. Additionally, one might misinterpret the inclusion of demographics as setting different targets for students based on demographic characteristics. That reasoning is flawed because growth models inherently set different targets relative to academic peers, not fixed targets. As discussed above, incorporating demographic and socioeconomic controls improves the definition of academic peers. Additionally, the incorporation of such controls has "limited impact on the whole," meaning the results for most schools are not very different than results from models that do not include includes. However, refining the definition of academic peers through such controls provides important guards for schools "in the most disparate circumstances."

Experts tend to prefer the inclusion of demographic and socioeconomic controls as a protective guard against over- and under-identification of schools in the most disparate circumstances as high- or low-performing, yet such statistical refinements are not always selected in policy decisions. Growth methodologies are incredibly complex, and decision-makers and advocates often have not been exposed to the underlying issues this article seeks to summarize. They are even less likely to have robust understanding of these complex issues. Both decision-makers and advocates operate in a highly politicized context, however. To understand that basic fact, one only has to marvel at how long it has taken most states, including California, to adopt growth methodologies into their accountability systems. Policy implementation lags far behind expert knowledge in the fields.

In 2024 or 2025, the California Department of Education may make available the results of the California Growth Model, approved by the State Board of Education. The California School Dashboard may eventually incorporate this data for informational purposes and/or as part of school accountability. Until these things happen, schools do not have access to a widely accepted growth methodology for CAASPP aside from CORE SGP. Charter schools may not choose to pay to a CORE SGP analysis, but if they do, one hopes that authorizers will embrace that data is an important part of charter renewal.

Castellano, K. E., & Ho, A. D. (2013). A Practitioner's Guide to Growth Models. Council of Chief State School Officers.
Koedel, C., Mihaly, K., & Rockoff, J. E. (2015). Value-added modeling: A review. Economics of Education Review, 47, 180-195.
Polikoff, M. (2019). On Growth Models: Time for California to Show Some Improvement. Policy Analysis for California Education.