CALIFORNIA SAFE AND SUPPORTIVE SCHOOLS

Construction of California's School Climate Index (SCI) for High Schools Participating in the Safe and Supportive Schools Program

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School Climate Index (SCI) at a glance

- Ranges from 100 to 500.
- Average SCI score was 300 in California in 2008/10.
- Higher SCI scores ⟶ more positive school climates.
- State percentile norms provided.
- State percentile norms for demographically similar schools provided.
- Identifies specific school climate areas needing the most improvement.
- Comprised of 3 domains and 8 subdomains
  - Supports and engagement
  - Low violence, victimization, and substance use at school
  - Low truancy incidents

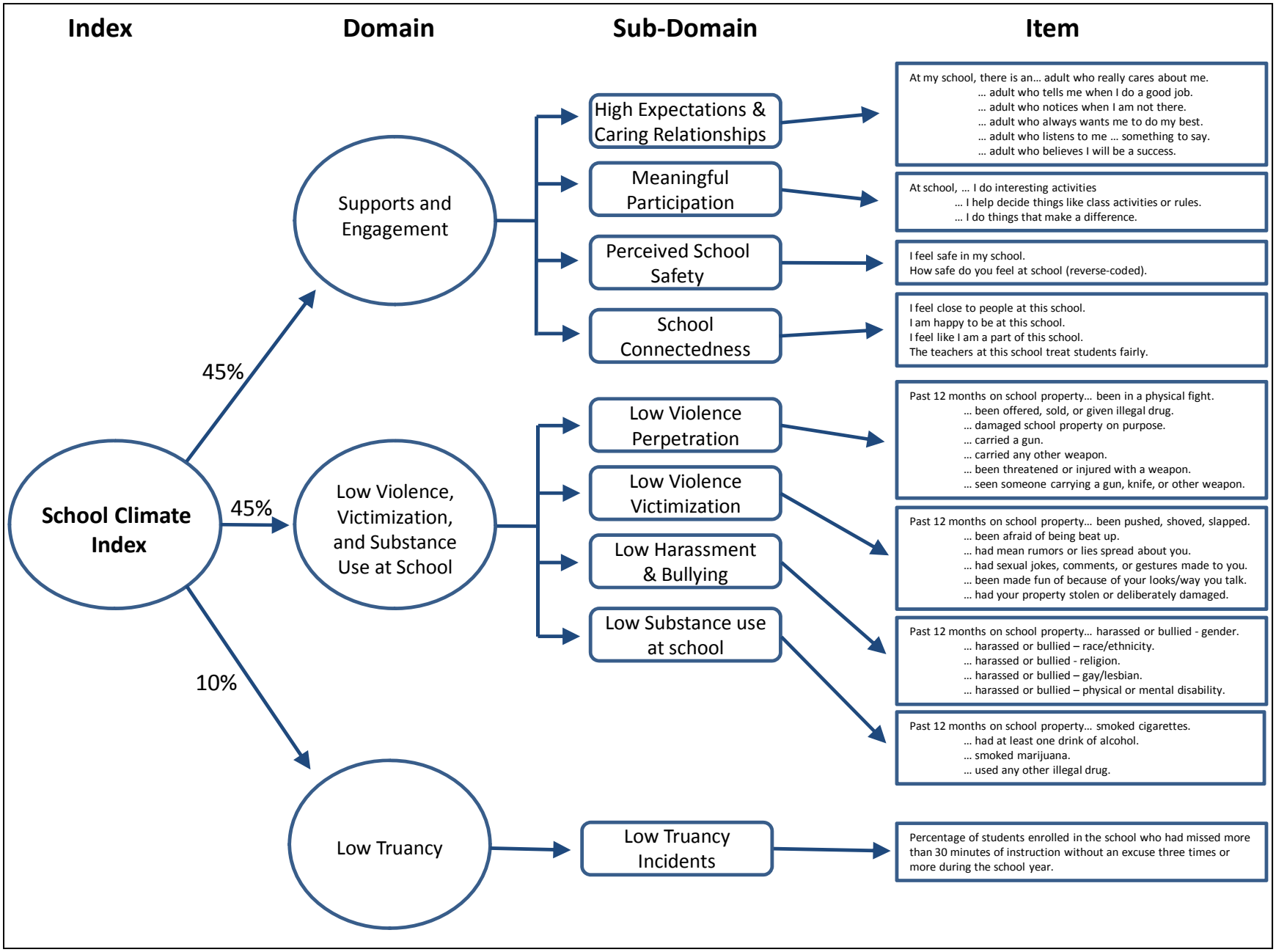
What is the School Climate Index (SCI)?

States that have been awarded Safe and Supportive Schools (S3) grants by the U.S. Department of Education are required to provide each participating school with a school safety score. California's school safety score is called the School Climate Index (SCI). The SCI was designed to facilitate school-to-school comparisons to identify schools most in need of programmatic interventions aimed at improving school climate. The SCI provides a state normed, school-level description of several factors that are known to influence learning success in schools. Scores on the SCI are based on **student California Healthy Kids Survey (CHKS) data** and **school-level truancy incident data**. SCI scores can range from 100 to 500, with higher scores representing more positive school climates. During the 2008-10 period, the average SCI score for all comprehensive high schools in California was 300.

The SCI is calculated by computing the weighted average of three domains: (1) *Supports and Engagement* (45%); (2) *Violence, Victimization, and Substance Use at School* (45%); and (3) *Truancy Incidents* (10%). The first two domains are measured based on a statistical model applied to CHKS items (see below). These two domains are themselves each measured by four subdomains, as listed below and as depicted in **Figure 1**.

- Supports and Engagement (45%)
  - High expectations and caring relationships at school (6 items)
  - Opportunities for meaningful participation at school (3 items)
  - Perceived school safety (2 items)
  - School connectedness (4 items)
- Low Violence, Victimization, and Substance Use at School (45%)
  - Low physical violence perpetration on school property(7 items)
  - Low physical and emotional violence victimization at school (6 items)
  - Low harassment and bullying at school (5 items)
  - Low substance use at school (4 items)
- Low Truancy (10%)
  - Truancy incidents (1 indicator)

Figure 1. Components of California School Climate Index



What the SCI is not

The SCI does not measure all aspects of school climate. It is based only on student survey data and truancy incidents. School climate is a global term representing the social and physical environment of the school – reflecting a school's culture; organizational structure; values; norms; and relationships between teachers, students, and other staff (Cohen 2006; Freiberg 1999). It includes such domains as teacher collegiality, teacher input into decision-making, student and teacher commitment to achievement, administrative practices, and the quality of school facilities. Although the SCI assesses important aspects of the school environment that are known to influence learning success in schools, school climate encompasses much more than those areas assessed with the SCI.

How was the SCI Calculated?

The SCI was developed by the California Department of Education's (CDE) Coordinated School Health and Safety Office in consultation with the statewide S3 Advisory Committee and the California S3 Technical Assistance and Evaluation Teams. Development of the SCI involved four inter-related steps:

1. Selection of CHKS survey items and school-level incident data that measure school climate.
2. Estimation of a measurement model of the CHKS school climate items.
3. Calculation of school-level SCI scores for a norming sample of high schools.
4. Calculation of school-level SCI scores for all schools in S3 districts.

Selection of School Climate Indicators

CDE and the California S3 Technical Assistance and Evaluation Teams, with input from the statewide S3 Advisory Committee, identified CHKS survey items and school-level incident data that measure important aspects of the school environment that are aligned with the U.S. Department of Education's S3 School Climate Model (Jennings, 2010). The team decided to select items that capture aspects of the school environment that practitioners have some degree of control over, such as student substance use at school, violence on school property, or student perceptions of support provided by adults in the school. Measures of students' behavior outside of school were not included in the SCI.

The SCI development team considered several sources of school-level incident data to include in the index, including truancy and suspension/expulsion rates. Ultimately, only the school-level truancy rate—an indicator of student engagement—was included in the index. Suspension/expulsion rates were not included because they were considered to be a better indicator of school discipline policy than of student school-related behavior. California defines truancy as missing 30 minutes or more of instruction time without an excuse on three or more days during the school year. The school-level truancy rate is defined as the number of students who were truant (as defined above) divided by school enrollment.

Estimation of School Climate Measurement Model

Analytic Strategy

A series of exploratory and confirmatory factor analysis models were estimated to ascertain the measurement structure of the selected CHKS school climate items. Exploratory factor analysis (EFA) models

were estimated to determine roughly the number of domains underlying the data and the measurement structure of the latent factors. A combination of criteria was used to determine the number of factors to retain in the EFAs, including fit indices, the number of eigenvalues greater than 1, conceptual clarity, and simplicity. Models with the smallest number of possible factors and models in which each item loaded on only one latent factor (no cross-loadings) were favored over more complex models. The results of the exploratory factor analysis models were used as a starting point for a series of nested confirmatory factor analysis (CFA) models. Measures of model fit, correlations among the latent constructs (factors), and factor-loading patterns were used to make decisions about models. To derive estimates for the EFA and CFA models, Muthén and Muthén's (2010) *Mplus* statistical modeling program was used to obtain estimates. Because all of the items used to measure school climate were dichotomous or ordinal, Muthén's (1984) approach to factor analysis with these types of indicators was used. To account for differences across schools in gender- and grade-specific response rates and missing value patterns, the measurement model was re-estimated after adding covariates for gender, school grade (11^{th} vs. 9^{th}), and a variable indicating the number of items with imputed values (see below).

Norming Sample

The analyses were based on pooled data from local school administration of the CHKS student instruments in comprehensive high schools in the 2008/09 or 2009/10 academic years – the most recent period in which data representative of the state are available. During this period, to be in compliance with Title IV of NCLB, the CDE required all schools and districts to administer the student surveys at least one time. High schools served by such districts were required to administer the student survey in grades 9 and 11. Prior to estimation of the measurement models, students who had missing values on 30 or more of 110 items on the CHKS core module were excluded from the analytic sample. For the remaining sample, items with missing values were imputed using a single instance of stochastic multivariate normal regression (Schafer, 1997). Schools with substantially different gender- and grade-specific survey participation rates were also excluded from the sample. The final analytic sample included 768 high schools and 432,730 students. This sample is referred to as the **norming sample**.

Measurement Model Results

The results of the EFA and CFA analyses showed that the items analyzed represent eight distinct first-order sub-domains of school climate: (1) high expectations and caring relationships, (2) opportunities for meaningful participation, (3) perceived school safety, (4) school connectedness, (5) physical violence perpetration, (6) physical/emotional violence victimization, (7) harassment and bullying, and (8) substance use at school (see **Figure 1** above). A second-order CFA model was then estimated to ascertain whether higher-order factors could account for the eight first-order sub-domains. The results of these analyses indicated that that eight subdomains identified in the first-order CFA reflect two global domains: (1) supports and engagement and (2) violence, victimization, and substance use at school (**Figure 1**).

Calculation of SCI for Norming Sample

SCI

Numeric values for the ten calculated domains (two global domains and eight sub-domains) of school climate were obtained by estimating factor scores for all respondents in the norming sample. Factor scores are estimates of the relative standing of respondents on the ten underlying school climate factors. Factor scores

were obtained with Mplus using an iterative Bayesian estimation procedure based on the estimated model and student responses. Averages of students' factor scores were then computed for each school. These school averages adjusted for school-to-school differences in the gender-, grade-, and missing value composition of each school. The school averages of the two global CHKS-derived school climate measures and the truancy incidence rate were standardized to have a mean of 0 and a standard deviation of 1, and the weighted average of the three measures was calculated for each school, with weights of 0.45 for the two global CHKS-derived measures and 0.10 for the truancy incidence rate. To compute the SCI, the resulting weighted average was then re-standardized to have a mean of 300 and a standard deviation of 50.

State Percentile and Similar Schools Percentile

State Percentiles for the SCI, the 10 CHKS-derived school climate measures, and the truancy incident rate were calculated based on the distribution of scores across all comprehensive high schools in the norming sample. The *State Percentile* tells what percentage of high schools had the same score as or a lower score than the applicable school. Percentiles range from 1 to 99. For example, a *State Percentile* of 25 means that 25 percent of high schools in the state had the same score as or a lower score than the score listed.

Similar Schools Percentile Rankings were also calculated to provide schools with school climate scores comparable to other schools serving students with similar demographic characteristics. Analogous to the methods used by CDE to calculate similar schools' ranks for Academic Performance Index (API) scores, a comparison group of schools for each school was defined based on the *School Characteristics Index*. The *School Characteristic Index* is a composite measure constructed by the CDE that identifies schools that are similar with regards to socio-demographic characteristics (California Department of Education, 2000). The index is based on school racial/ethnic composition, the percent of English language learners, student mobility, parental education, free/reduced-price lunch eligibility, average class size, the percent of credentialed teachers, and other factors. Each of the items used in the index is weighted by its relationship to academic performance. Schools with higher scores have more characteristics that are associated with higher school performance.

For each school in the norming sample, a comparison group of 100 schools was formed by taking the 50 schools ranked sequentially below and the 50 schools ranked sequentially above the *School Characteristics Index* of that of the applicable school. When a school's *School Characteristics Index* was within the bottom 50 schools of the norming sample distribution, that school's comparison group was formed by taking all the schools (if applicable) with lower ranks and the 50 schools ranked sequentially above the school. For example, the comparison group for the school with the lowest *School Characteristics Index* value in the state is comprised of the 50 schools with ranks of 2 through 51. The comparison group for the school with the 26th lowest *School Characteristics Index* value is comprised of the 25 schools with lower values and the 50 schools with higher values. In such a situation, the observed rank was converted to a percentile rank, ranging from 1 to 99, even though the comparison group of schools in the bottom 50 schools of the norming population is comprised of fewer than 100 schools. An analogous procedure was used to identify a comparison group for schools with *School Characteristics Index* values within the top 50 schools of the norming sample distribution.

Calculation of SCI For schools in S3 Districts – 2011 and Beyond

Calculation of SCIs for schools in S3 districts in 2011 and later years used similar procedures as that described for the norming sample. The parameters of the 2008-10 norming sample measurement model were used to

create factor scores for students in S3 schools in 2011. Factor score estimates for the 2011 sample were obtained using the iterative Bayesian procedure implemented in Mplus. Adjusted factor score averages were then computed for each school. The school averages of the two global CHKS-derived school climate measures and the truancy incidence rate were standardized by subtracting the applicable norming sample mean from each value, and dividing by the norming sample standard deviation. After standardization, the weighted average of the three measures was calculated for each school. Finally, using the 2008-10 norming sample mean and standard deviation, the resulting weighted average was then re-standardized to have the same metric as the 2008-10 SCI. The 2008-10 norming sample was then used to calculate *State Percentiles* and *Similar Schools Percentile Rankings* for each 2011 school. Note that the measurement parameters used to calculate SCI-, SCI domain-, and SCI sub-domain scores and the percentile norms are based on data collected from all comprehensive high schools in California that administered the CHKS in 2008/09 or 2009/10 (the norming sample). It is anticipated that the same norming sample will be used in 2012, 2013, and 2014 so that each school's absolute progress in improving school climate can be assessed across time.

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