



Measurement Analysis of California School Climate, Health, and  
Learning Survey (Cal-SCHLS) for Parents

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## Findings and recommendations

We conducted a series of factor analyses using items from the parent California School Climate, Health, and Learning Surveys (Cal-SCHLS). The purpose of these analyses was to determine the measurement structure of items included on the 2010-11 parent surveys – the first academic year that the parent survey was widely administered. The Cal-SCHLS parent surveys were designed to assess parent perceptions regarding several school climate dimensions, including parental involvement, student supports, the discipline and safety environment, and perceptions of learning-related student behaviors. This is the first empirical measurement analyses conducted for the parent surveys.

The results of the analyses suggest that the items analyzed represent only two distinct dimensions: (1) school organizational supports (20 items) and (2) perceptions of learning-related behavior (8 items). These two global measures exhibit very high internal consistency reliability ( $\alpha > 0.90$ ). When smaller groups of items were used to identify more fine-grained measures—such as parental involvement, cultural sensitivity, or clarity and equity of discipline policies—the resulting scales were too strongly correlated with each other to support the presence of empirically distinct measures. Because it is unclear how useful the two global measures identified from the Cal-SCHLS parent survey will be with regards to targeting areas of school climate in need of improvement, we recommend that both scale score- and item-specific results be presented in summary reports. We also recommend continuing to investigate using these scales in future summary reports.

## Purpose

This document describes the results of a series of factor analyses conducted on data collected from the 2010-11 administration of the parent survey component of the California School Climate, Health, and Learning Surveys (Cal-SCHLS) by 167 high schools in 52 school districts in 2010-11. The purpose of these analyses was to determine the measurement structure of the items included in the 2010-11 version of the parent survey. In addition to examining the dimensionality of scales via exploratory and confirmatory factor analysis models, we also examined the reliability of derived scales by estimating internal consistency reliability coefficients.

## Sample

The analytic sample was based on Cal-SCHLS parent survey data collected from 8,689 parents of high school students. The majority of parent respondents reported that they had one child that attended the school (95%). Approximately 50% reported that their child received a free or reduced price meal at school and 30% reported that their child takes Honors/AP classes or is in Gifted and Talented Education program. About 44% of the respondents were Latino/a, 25% were white, 12% were Asian, and 6% were African American. The remaining 13% marked one of the other responses (i.e., American Indian, Pacific Islander, Other/Multi-ethnic) or declined to answer the question.

## Analytic Strategy

To ascertain the factor structure of the parent survey items, we fitted a series of exploratory and confirmatory factor analysis models. Exploratory factor analysis (EFA) models were estimated to determine roughly the number of factors underlying the data and the measurement structure of the latent factors. A combination of factors 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.

We then used the results of the exploratory factor analysis models as a starting point for a series of nested confirmatory factor analysis (CFA) models. We used measures of model fit, correlations among the latent constructs (factors), and factor-loading patterns to make decisions about models

To derive estimates for the EFA and CFA models, we used Muthén and Muthén's (2010) *Mplus* statistical modeling program. Because all of the items used are dichotomous or ordinal, we used Muthén's (1984) approach to exploratory and confirmatory factor analysis with categorical indicators.

Table 1 below shows the Cal-SCHLS parent survey items included in the analyses.

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**Table 1.** Cal-SCHLS Parent Survey items included in measurement analyses (Section 1)

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- Q7. This school... promotes academic success for all students.
- Q8. This school... treats all students with respect.
- Q9. This school... clearly tells students in advance what will happen if they break school rules.
- Q10. This school... encourages all students to enroll in challenging courses regardless of their race, ethnicity, or nationality.
- Q11. This school... gives all students opportunity to “make a difference” by helping other people, the school, or the community.
- Q12. This school... keeps me well-informed about school activities.
- Q13. This school... provides quality counseling or other ways to help students with social and emotional needs.
- Q14. This school... is an inviting place for students to learn.
- Q15. This school... allows input and welcomes parents’ contributions.
- Q16. This school... provides students with healthy food choices.
- Q17. This school... communicates the importance of respecting all cultural beliefs and practices.
- Q18. This school... gives my child opportunities to participate in classroom activities.
- Q19. This school... provides instructional materials that reflect my child’s culture, ethnicity, and identity.
- Q20. This school... enforces school rules equally for my child and all students.
- Q21. This school... provides quality activities that met my child’s interests and talents, such as sports, clubs, and music.
- Q22. This school... has quality programs for my child’s talents, gifts, or special needs.
- Q23. This school... is a safe place for my child.
- Q24. This school... keeps me well-informed about my child’s progress in school.
- Q25. This school... promptly responds to my phone calls, messages, or emails.
- Q26. This school... encourages me to be an active partner with the school in educating my child.
- Q27. How much of a problem at this school is... student alcohol and drug use?
- Q28. How much of a problem at this school is... harassment or bullying of students?
- Q29. How much of a problem at this school is... physical fighting between students?
- Q30. How much of a problem at this school is... racial/ethnic conflict among students?
- Q31. How much of a problem at this school is... students not respecting staff?
- Q32. How much of a problem at this school is... gang-related activity?
- Q33. How much of a problem at this school is... weapons possession?
- Q34. How much of a problem at this school is... vandalism (including graffiti)?
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## Exploratory Factor Analysis Results

Table 2 shows the goodness-of-fit information for the series of EFA models estimated. The goodness-of-fit information from the EFA models suggests that the 3-factor model provides the best fit to the data. However, for solutions involving more than 2 factors, examination of the factor patterns indicated the persistence of factors with no substantively significant item loadings. The factor patterns revealed by the higher-order solutions did not reveal distinct, interpretable underlying factors. The 2-factor solution is also consistent with the eigenvalue pattern, as only two of the values are greater than 1. We therefore used the 2-factor solution as our benchmark model for the CFA models. The factor pattern and loadings for the 2-factor solution are displayed in Table 3. As shown by the **bolded loadings** in Table 3, only two global factors were revealed: (1) school organizational supports (20 items) and (2) perceptions of learning-related behavior (8 items).

**Table 2.** Cal-SCHLS staff survey measures - goodness-of-fit information and eigenvalues for EFA models (teacher sample)

Model	RMSEA	CFI	TLI	SRMR	Eigenvalues
1 Factor	0.151	0.788	0.771	0.195	13.286
2 Factor*	0.072	0.955	0.948	0.030	4.928
3 Factor	0.061	0.970	0.962	0.026	0.841
4 Factor	0.050	0.982	0.975	0.021	0.726
5 Factor	0.043	0.988	0.982	0.017	0.688

Notes: Analytic sample consists of 8,673 parents in comprehensive high schools who provided responses on the 2010-11 Cal-SCHLS parent survey.

\* Preferred model.

RMSEA = Root Mean Square Error of Approximation (recommended value  $\leq 0.06$ ).

SRMR = Standardized Root Mean Square Residual (recommended value  $\leq 0.06$ ).

CFI = Comparative Fit Index (recommended value  $\geq 0.95$ ).

TLI = Tucker Lewis Index (recommended value  $\geq 0.95$ ).

**Table 3. Cal-SCHLS EFA factor loadings— 2-factor solution (parents)**

Item	Item Description	1	2
<b>This school...</b>			
Q7.	...promotes academic success for all students.	<b>0.80</b>	0.00
Q8.	...treats all students with respect.	<b>0.79</b>	-0.05
Q9.	...clearly tells students in advance what will happen if break school rules.	<b>0.72</b>	0.01
Q10.	...encourages ... students ... challenging courses regardless of race/ethn.	<b>0.78</b>	-0.02
Q11.	...gives all students opportunity to “make a difference” ...	<b>0.81</b>	0.00
Q12.	...keeps me well-informed about school activities.	<b>0.73</b>	0.00
Q13.	...provides quality counseling/other ways to help students with ... needs.	<b>0.78</b>	0.03
Q14.	...is an inviting place for students to learn.	<b>0.82</b>	-0.06
Q15.	...allows input and welcomes parents’ contributions.	<b>0.81</b>	-0.01
Q16.	...provides students with healthy food choices.	<b>0.64</b>	-0.01
Q17.	...communicates the importance respecting cultural beliefs/practices.	<b>0.80</b>	-0.04
Q18.	...gives my child opportunities to participate in classroom activities.	<b>0.81</b>	0.02
Q19.	...provides instructional materials that reflect my child’s culture...	<b>0.80</b>	0.01
Q20.	...enforces school rules equally for my child and all students.	<b>0.79</b>	-0.05
Q21.	...provides quality activities that met my child’s interests and talents...	<b>0.79</b>	0.07
Q22.	... has quality programs for my child’s talents, gifts, or special needs.	<b>0.82</b>	0.05
Q23.	...is a safe place for my child.	<b>0.70</b>	-0.22
Q24.	...keeps me well-informed about my child’s progress in school.	<b>0.78</b>	0.04
Q25.	...promptly responds to my phone calls, messages, or emails.	<b>0.74</b>	-0.01
Q26.	...encourages me to be active partner with school in educating my child.	<b>0.81</b>	0.01
<b>Based on your experience, how much of a problem at this school is...</b>			
Q27.	...student alcohol and drug use?	0.05	<b>0.77</b>
Q28.	...harassment or bullying of students?	0.06	<b>0.80</b>
Q29.	...physical fighting between students?	0.00	<b>0.85</b>
Q30.	...racial/ethnic conflict among students?	0.01	<b>0.83</b>
Q31.	...students not respecting staff?	0.06	<b>0.75</b>
Q32.	...gang-related activity?	0.04	<b>0.89</b>
Q33.	...weapons possession?	0.09	<b>0.91</b>
Q34.	...vandalism (including graffiti)?	0.03	<b>0.81</b>

## Confirmatory Factor Analysis Results

Using the 2-factor EFA model as a foundation, we estimated a series of confirmatory factor analysis (CFA) models to determine the “optimal model” underlying the parent survey items. Measures of model fit, correlations among the constructs (factors), and factor loading patterns were used to make decisions about models. Table 2 provides goodness-of-fit information for some of the CFA models estimated.

**Table 4.** CHKS measures - goodness-of-fit information for CFA Models

Model	RMSEA	CFI	TLI	WRMR
Model 1* – 2 factor model (school organizational supports and learning-related behavior )	0.059	0.968	0.965	4.53
Model 2 – 3 factor model (school organizational supports, learning-related behavior, and parental involvement)	0.055	0.972	0.970	4.19
Model 3 – 3 factor model (school organizational supports, learning-related behavior, and meaningful participation)	0.056	0.971	0.969	4.27
Model 4 – 4 factor model (school organizational supports, learning-related behavior, parental involvement, and meaningful participation)	0.052	0.975	0.973	3.92
Model 5 – 6 factor model (school organizational supports, parental involvement, meaningful participation, cultural sensitivity, discipline clarity, and learning-related behavior)	0.53	0.975	0.972	3.88

Notes: Analytic sample consists of 8,673 parents in comprehensive high schools who provided responses on the 2010-11 Cal-SCHLS parent survey.

\* Preferred model.

RMSEA = Root Mean Square Error of Approximation (recommended value  $\leq 0.06$ ).

CFI = Comparative Fit Index (recommended value  $\geq 0.95$ ).

TLI = Tucker Lewis Index (recommended value  $\geq 0.95$ ).

WRMR = Weighted Root Mean Square Residual (recommended value of  $\leq 1.0$  or minimum value)

The first estimated CFA model (Model 1) in Table 4 is equivalent to the 2-factor EFA model shown in Table 3, except that the items loadings are restricted such that they do not cross-load across the two constructs. Model 2 is equivalent to Model 1 except that separate constructs were specified for *parental involvement*<sup>1</sup> and *school organizational supports*. This modification

<sup>1</sup> Items 12, 15, 24, 25, and 26 were used as indicators of parental involvement.

resulted in an improvement in model fit, as evidenced by a reduction in the WRMR.<sup>2</sup> However, the estimated correlation between the *parental involvement* and *school organizational support* factors was 0.91. Additional calculations indicated that there was too much overlap between the *parental involvement* and *school organizational supports* factors to discriminate between the two constructs.<sup>3</sup> We therefore rejected Model 2 and used the *parental involvement* items as indicators of a global *school organizational support* construct.

In Model 3, separate constructs were specified for *opportunities for meaningful participation*<sup>4</sup> and *school organizational supports*. Again, although this modification resulted in an improvement in model fit over Model 1, *opportunities for meaningful participation* and *school organizational supports* were too strongly correlated (0.92) to be considered distinct domains. Models 4 and 5 were estimated to further ascertain whether more fine-grained constructs could be detected with the parent survey items. In all cases, the correlations between the resulting constructs were greater than 0.90. We therefore conclude that the data do not support the presence of empirically distinct subdomains within school organizational supports, at least with respect to the items included in the current version of the Cal-SCHLS parent survey. Thus, the Cal-SCHLS parent survey appears to measure two global factors: (1) school organizational supports and (2) perceptions of learning-related behavior. The CFA-derived factor loadings and factor correlations are presented in Table 5.

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<sup>2</sup> Because WRMR has been tested for models with categorical outcomes (see Yu and Muthén 2001), we place greater weight on this index in CFA model selection than on the RMSEA, CFI, and TLI.

<sup>3</sup> We used Fornell and Larcker's (1981) test for assessing discriminant validity of factors (i.e., the extent to which latent variables adequately discriminate from other latent variables). This involves comparing the average variance explained by the latent factor on observed indicators with the shared variance explained by latent factors. If the shared variance explained with any other construct is larger than the average variance explained by a latent factor, then discriminant validity is not supported.

<sup>4</sup> Items 7, 8, 14, and 18 were used as indicators of opportunities for meaningful participation.



**Table 5.** Final 2-factor CFA model – factor loadings and factor correlation – Parents

Item	Item Description	Loadings	Standardized Loadings
<b>School Organizational Supports</b>			
<i>This school...</i>			
Q7.	...promotes academic success for all students.	1	0.80
Q8.	...treats all students with respect.	1.01	0.81
Q9.	...clearly tells students in advance what will happen if break school rules.	0.89	0.72
Q10.	...encourages ... students ... challenging courses regardless of race/ethn.	0.98	0.78
Q11.	...gives all students opportunity to “make a difference” ...	1.01	0.81
Q12.	...keeps me well-informed about school activities.	0.91	0.73
Q13.	...provides quality counseling/other ways to help students with ... needs.	0.96	0.77
Q14.	...is an inviting place for students to learn.	1.04	0.84
Q15.	...allows input and welcomes parents’ contributions.	1.01	0.81
Q16.	...provides students with healthy food choices.	0.81	0.65
Q17.	...communicates the importance respecting cultural beliefs/practices.	1.02	0.81
Q18.	...gives my child opportunities to participate in classroom activities.	1.01	0.81
Q19.	...provides instructional materials that reflect my child’s culture...	0.99	0.79
Q20.	...enforces school rules equally for my child and all students.	1.01	0.81
Q21.	...provides quality activities that met my child’s interests and talents...	0.95	0.76
Q22.	... has quality programs for my child’s talents, gifts, or special needs.	1.00	0.80
Q23.	...is a safe place for my child.	0.97	0.78
Q24.	...keeps me well-informed about my child’s progress in school.	0.95	0.76
Q25.	...promptly responds to my phone calls, messages, or emails.	0.92	0.74
Q26.	...encourages me to be active partner with school in educating my child.	1.01	0.81
<b>Learning-Related Behavior</b>			
<i>Based on your experience, how much of a problem at this school is...</i>			
Q27.	...student alcohol and drug use?	1	0.79
Q28.	...harassment or bullying of students?	1.04	0.83
Q29.	...physical fighting between students?	1.07	0.85
Q30.	...racial/ethnic conflict among students?	1.06	0.84
Q31.	...students not respecting staff?	0.99	0.79
Q32.	...gang-related activity?	1.10	0.87
Q33.	...weapons possession?	1.09	0.86
Q34.	...vandalism (including graffiti)?	1.01	0.80
School Organizational Supports and Learning-Related Behavior			
<b>Correlation</b>			0.32

Notes: Analytic sample consists of 8,673 parents in comprehensive high schools who provided responses on the 2010-11 Cal-SCHLS parent survey.

## Reliability of derived CHKS Core/School Climate Module scales

We calculated internal consistency estimates of the scales using Cronbach’s alpha coefficient for the overall sample. These estimates are presented in Table 6. The derived scales demonstrate high levels of reliability, ranging from 0.91 to 0.95. In sum, the internal consistency reliability estimates are of sufficient magnitude to support use of the derived scales in research.

**Table 7.** Internal consistency reliability coefficients of derived parent survey scales

	All
<b>Parent Survey Constructs</b>	
School Organizational Supports	0.95
Learning-Related Behavior	0.91

*Notes:* Analytic sample consists of 8,673 parents in comprehensive high schools who provided responses on the 2010-11 Cal-SCHLS parent survey.

## Summary

We conducted a series of factor analyses using items from the Cal-SCHLS parent survey. The purpose of these analyses was to determine the measurement structure of the items included in the 2010-11 parent survey as implemented by the 167 comprehensive high schools that administered the survey. The Cal-SCHLS parent survey was designed to assess parent perceptions regarding several school climate dimensions, including parental involvement, student supports, the discipline and safety environment, and perceptions of learning-related student behaviors. This is the first empirical measurement analyses conducted to assess how well the parent survey measures these areas.

The results of the analyses suggest that the items analyzed represent only two distinct dimensions: (1) school organizational supports (20 items) and (2) perceptions of learning-related behavior (8 items). When smaller groups of items were used to identify more fine-grained measures—such as parental involvement, cultural sensitivity, or clarity and equity of discipline policies—the resulting scales were too strongly correlated with each other to support the presence of empirically distinct measures. The two global scales derived from the survey exhibit good internal consistency. We recommend continuing to investigate using these scales in future summary reports.

## References

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