

School Climate, Parent Involvement, and Exclusionary Discipline: A Cross-Lagged Panel Study of Kentucky Schools

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Abstract

Exclusionary discipline is a prevalent and inequitable feature of American schooling, and both school climate and parent involvement are widely advanced as levers for reducing it. Yet the evidence linking parent involvement to the behavioral environment of schools is largely cross-sectional and academic in focus, and the three constructs are rarely modeled together over time. Using a statewide, four-wave panel of Kentucky schools ($N = 719$) spanning the 2021–2022 through 2024–2025 school years, we estimated a random-intercept cross-lagged panel model to separate stable between-school differences from within-school change in parent involvement, school climate, and out-of-school suspension. At the within-school level, an increase in a school's climate predicted a small subsequent reduction in out-of-school suspension ($\beta = -.08$), whereas the reverse path was not supported. Parent involvement, operationalized as participation in site-based governance, was unrelated to subsequent climate or discipline at the within-school level, its associations being confined to stable between-school differences, and this null persisted across the involvement measures we examined. The schoolwide climate-suspension relation was not reliably detected within individual student groups, whose smaller and partly suppressed samples afforded limited statistical power, and data suppression precluded any estimate for Black students. Findings indicate that the disciplinary environment of schools is more responsive to their climate than to the school-based forms of parent involvement recorded in accountability data, and they illustrate how random-intercept models distinguish between-school associations from the within-school dynamics of greatest interest to research and practice. Implications for measurement, data infrastructure, and the study of disciplinary disproportionality are discussed.

Highlights

- Within schools, climate gains predicted small, later declines in out-of-school suspension.
- The reverse path, from suspension to climate over time, was not supported.
- Governance-based parent involvement showed no within-school link to discipline.
- The involvement null held across the involvement measures examined.
- Random-intercept models separated between- from within-school relations.

Introduction

Each year, hundreds of thousands of students are removed from instruction through out-of-school suspension, and the burden of that removal is unevenly distributed. In the most recent federal Civil Rights Data Collection, students with disabilities represented 14% of enrollment but 24% of students who received one or more out-of-school suspensions, and Black students represented 15% of enrollment but 18% of those suspended (U.S. Department of Education, Office for Civil Rights [OCR], 2023). Before the instructional disruptions of the COVID-19 pandemic, more than 2.5 million students received at least one out-of-school suspension in a single school year (OCR, 2018). Exclusionary discipline is consequential. Removing students from the classroom is associated with lower academic achievement,

disengagement, grade retention, dropout, and subsequent contact with the juvenile justice system, and because these removals fall disproportionately on Black students and students with disabilities, exclusionary discipline is at once an academic and an equity concern (Gregory et al., 2010; Skiba et al., 2014).

In response, schools have increasingly adopted school-wide frameworks intended to improve the behavioral environment and reduce reliance on exclusionary practice. School-wide positive behavioral interventions and supports (SWPBIS), the most widely implemented such framework, has demonstrated robust effects on disciplinary outcomes, including reductions in office discipline referrals and suspensions, across randomized trials and large-scale statewide evaluations (Bradshaw et al., 2012; Authors, 2018; Authors, 2020). A common thread across these frameworks is the improvement of school climate, the shared norms, relationships, safety, and sense of connection that characterize a school (Thapa et al., 2013). School climate is understood as a proximal condition of the behavioral environment: schools with more positive climates are expected to rely less on exclusionary responses to student behavior. What is less clear is whether improvements in a school's climate actually precede reductions in its use of exclusionary discipline, or whether the two simply covary because some schools are persistently more orderly than others.

Parent involvement is frequently advanced as a second lever for improving schools, and it occupies a prominent place in education policy and practice. A half century of research links parent involvement to student achievement. In a second-order meta-analysis synthesizing 1,177 primary studies, Kim (2022) reported a positive association between naturally occurring parent involvement and achievement ($r = .18$), with academic socialization showing the strongest relation ($r = .29$) and homework help showing essentially none ($r = -.01$). Meta-analyses of the parental-expectations component of involvement (Jeynes, 2024) and of parent-involvement interventions (Cosso et al., 2022) report comparable small-to-medium effects, and family-school engagement interventions have been shown to strengthen the parent-teacher relationship (Smith et al., 2022). Theoretically, involvement is understood through parents' construction of their role in their children's education and their motivation to enact it (Hill, 2022; Hoover-Dempsey & Sandler, 1997), and its influence on students is thought to operate through proximal processes such as school engagement (Martinez-Yarza et al., 2024). Policy has institutionalized these ideas: the Every Student Succeeds Act (2015) requires family-engagement provisions, and in some states, including Kentucky, parents hold formal roles in school governance through site-based decision-making councils.

Despite the intuitive appeal of parent involvement as a lever for school improvement, several features of the existing evidence limit what can be concluded about its role in the behavioral environment of schools. First, the outcomes examined are almost exclusively academic. Meta-analytic attention has centered on achievement (Kim, 2022; Şengönül, 2022), and the comparatively few estimates involving behavior come largely from individual-level or early-childhood samples (Cosso et al., 2022; Jeynes, 2024); whether parent involvement is related to school-level exclusionary discipline or climate has received little direct attention. Second, the evidence is overwhelmingly cross-sectional. In a recent

systematic review of parent involvement and student engagement, 73% of the studies used cross-sectional designs (Yang et al., 2023), and the inability to establish directionality is repeatedly named as a limitation (Kim, 2022). Cross-sectional and between-unit associations cannot distinguish stable differences among schools from change within schools over time, yet it is the within-school question, whether increasing a school's involvement precedes improvement in its climate or its discipline, that bears most directly on practice. Third, parent involvement is multidimensional, and its dimensions do not behave alike; distinct components such as academic socialization, home-based involvement, school-based participation, and homework help show markedly different associations with outcomes (Kim, 2022; Kohl et al., 2000), and role construction is culturally and developmentally situated (Hill, 2022), such that treating involvement as a single, undifferentiated quantity risks obscuring these distinctions. Finally, parent involvement, school climate, and exclusionary discipline are rarely modeled together over time, leaving their reciprocal, prospective relations largely uncharacterized.

In this study, we examined the reciprocal, within-school relations among parent involvement, school climate, and exclusionary discipline using a statewide, four-wave panel of Kentucky schools spanning the 2021-2022 through 2024-2025 school years. We used a random-intercept cross-lagged panel model to separate stable, between-school differences from within-school change, an approach that directly addresses the cross-sectional limitation of prior work and permits a test of prospective directionality among the three constructs. We further examined whether any within-school relation between climate and discipline differed across student groups, given the disproportionate concentration of exclusionary discipline among historically marginalized students. Specifically, we asked (a) to what extent are parent involvement, school climate, and out-of-school suspension reciprocally related within schools over time, net of stable between-school differences; (b) does parent involvement prospectively predict school climate or exclusionary discipline, or are its associations with these constructs attributable to stable between-school differences; and (c) does the within-school relation between school climate and out-of-school suspension differ across student groups?

Method

Data Source and Sample

We examined school-level data from the Kentucky School Report Card (KSRC), the public accountability reporting system maintained by the Kentucky Department of Education (KDE). The KSRC compiles annual indicators for all public schools in the Commonwealth, including measures of school climate, disciplinary practice, and family engagement. We constructed a four-wave panel spanning the 2021–2022 through 2024–2025 school years. This window represents the earliest period for which school climate, out-of-school suspension (OSS), and parent-involvement indicators were reported on a consistent basis following the accountability disruptions of the COVID-19 pandemic; traditional attendance-based indicators were not comparably collected during 2020–2021 and 2021–2022 and were therefore unavailable as an earlier wave (KDE, n.d.).

The analytic sample comprised 719 schools with complete data on all three focal constructs across all four waves. We restricted the sample to schools serving standard grade configurations and excluded district- and state-level aggregate records. As reported in Table 1, the sample included 344 elementary schools (47.8%), 209 middle schools (29.1%), and 166 high schools (23.1%). Mean enrollment was 592.7 students ($SD = 345.4$), ranging from 95 to 2,313. On average, schools enrolled 73.6% White students, 10.5% Black students, and 9.5% Hispanic students; 62.9% of students were economically disadvantaged, and 18.7% received special education services under an individualized education program (IEP). Requiring complete data across four consecutive years excluded 423 schools that were present in at least one wave. Compared with these excluded schools, the analytic sample enrolled substantially larger schools (592.7 vs. 332.7 students, $d = 0.85$) and a smaller proportion of students with disabilities (18.7% vs. 27.7%, $d = -0.65$), and reported slightly lower economic disadvantage (62.9% vs. 66.6%, $d = -0.25$) and somewhat lower average climate ($d = -0.82$); the excluded schools were disproportionately small, specialized, and alternative programs. The analytic sample was closely representative of Kentucky schools in racial and ethnic composition. Findings should be generalized to comprehensive schools of typical size, and may not extend to small or specialized settings, which were underrepresented.

Table 1
Demographic Characteristics of the Analytic Sample and the Kentucky School Population

Characteristic	Analytic sample (n = 719)	Kentucky schools (N = 1,350)
School level, n (%)		
Elementary	344 (47.8)	697
Middle	209 (29.1)	234
High	166 (23.1)	193
Enrollment, M (SD)	592.7 (345.4)	471.2 (336.0)
White, %	73.6	74.0
Black, %	10.5	11.2
Hispanic, %	9.5	9.2
Economically disadvantaged, %	62.9	64.8
With disability (IEP), %	18.7	22.7
<i>Note.</i> IEP = individualized education program. Statewide level counts exclude 226 ungraded or nonstandard schools without an assigned level. Values for race, ethnicity, economic disadvantage, and disability are school-level means.		

Measures

School climate. KDE derives school climate from the Quality of School Climate and Safety survey, administered annually to students, and reports two school-level index scores, a Climate index and a

Safety index, each scaled from 0 to 100. The two indices were strongly correlated ($r = .98$), and we averaged them to form a single school climate composite consistent with their shared underlying construct. Index scores were available directly for 2022–2023 through 2024–2025. For 2021–2022, we reconstructed the composite from the 2022–2023 status score and its reported year-over-year change value; the reconstructed scores correlated .92 with the observed 2022–2023 scores and fell entirely within the valid range, supporting their use as the first wave.

Out-of-school suspension. We operationalized exclusionary discipline as the school-level count of out-of-school suspensions reported in the KDE Safe Schools discipline resolution files, divided by total enrollment to yield an OSS rate per student. We applied a common enrollment denominator across waves because school size was highly stable over the four years and because the random-intercept specification described below absorbs stable between-school differences in size.

Parent involvement. The KSRC reports several indicators of family engagement, including counts of parent-teacher conferences, volunteer hours, and participation in School-Based Decision Making (SBDM) council elections. These indicators were weakly intercorrelated (all r s < .20), indicating that they index distinct facets of engagement rather than a single latent construct. The parent-teacher conference count was moderately associated with the proportion of students with disabilities ($r = .34$), consistent with the mechanical contribution of federally mandated IEP meetings, which are recorded as conferences. We therefore operationalized parent involvement as the SBDM voting rate, the count of parents voting in site-based governance elections divided by enrollment, which indexes voluntary civic engagement and was minimally associated with disability composition ($r = .11$).

School composition. We characterized school composition using the proportion of students who were economically disadvantaged and the proportion receiving services under an IEP, drawn from KDE membership and special education files.

Data Analysis

We examined the reciprocal, within-school relations among parent involvement, school climate, and OSS using a random-intercept cross-lagged panel model (RI-CLPM; Hamaker et al., 2015; Mulder & Hamaker, 2021). The traditional cross-lagged panel model confounds between-school and within-school sources of variation, such that its cross-lagged parameters reflect a mixture of stable rank-order differences among schools and the within-school processes of theoretical interest (Hamaker et al., 2015). Because schools differ persistently in climate, discipline, and family engagement for reasons that are largely time invariant, such as the communities they serve and their enduring organizational conditions, this conflation is consequential for the present questions. Estimating an ordinary cross-lagged model on these data would risk interpreting a stable association between, for example, high-climate and low-suspension schools as evidence that a change in one precedes a change in the other.

The RI-CLPM addresses this limitation by adding a random intercept for each construct that captures the stable, between-school trait, so that the autoregressive and cross-lagged parameters are estimated

exclusively on the within-school deviations from each school's own expected trajectory. The cross-lagged parameters therefore answer a within-school question: when a school departs from its own typical level on one construct, does a corresponding change follow on another at the next wave. The random intercepts, in turn, index the stable between-school differences and may themselves be correlated, allowing us to characterize the between-school structure separately from the within-school dynamics. This decomposition is central to our research questions, which concern whether parent involvement, school climate, and exclusionary discipline are prospectively and reciprocally related within schools over time.

For school i at wave t , each observed indicator (climate C , suspension D , or involvement P) was decomposed into a wave-specific mean, a between-school random intercept, and a within-school deviation, illustrated here for climate:

$$C_{it} = \mu_t + \eta_i + c_{it}$$

where μ_t is the wave-specific mean, η_i is the between-school random intercept, and c_{it} is the within-school deviation. The within-school deviations followed a first-order cross-lagged structure; for suspension,

$$d_{it} = \alpha_D d_{i,t-1} + \gamma_{CD} c_{i,t-1} + \gamma_{PD} p_{i,t-1} + \zeta_{it}$$

with analogous equations for climate and involvement. Each within-school component was regressed on the prior-wave value of all three constructs, yielding three autoregressive parameters (α), which represent within-school stability, and six cross-lagged parameters (γ), which represent the prospective within-school effects of primary interest; γ_{CD} , for instance, is the effect of climate on subsequent OSS, estimated net of prior OSS, prior involvement, and the stable between-school traits.

Model specification and identification. Following the standard RI-CLPM parameterization (Mulder & Hamaker, 2021), we fixed the loadings from the random intercepts and the within-school factors to their observed indicators at 1.0, fixed the residual variances of the observed indicators to 0, and freely estimated the variances of the within-school components and the three random intercepts. The random intercepts were permitted to covary with one another but were constrained to be orthogonal to the wave-1 within-school components, an identification restriction required to separate the between- and within-school partitions. We constrained the autoregressive parameters, the cross-lagged parameters, and the within-wave residual covariances to equality across the three lag intervals, imposing stationarity of the within-school dynamics; this specification is more parsimonious and, with four waves, affords greater precision than a model with freely estimated lag-specific parameters. We evaluated the tenability of the stationarity constraints with a scaled (Satorra-Bentler) chi-square difference test against a model with freely estimated lag-specific parameters and, as a robustness check, examined the interval-specific estimates of the focal path (reported in the Results).

Standardization and estimation. We standardized each variable within wave prior to estimation, so that the cross-lagged parameters are expressed on a common metric and are comparable across constructs measured on different scales, such as a 0-100 climate index and a per-student suspension rate. Within-wave standardization additionally removes any secular trend common to all schools, so that the within-school parameters reflect deviations relative to the statewide distribution in each year rather than absolute change. We estimated all models with robust (Huber-White) maximum likelihood, which yields parameter standard errors and a scaled test statistic robust to non-normality. The analytic sample was restricted to schools with complete data on all three constructs across all four waves (listwise deletion); we characterize the resulting selection in the Setting and Participants section. We evaluated model-data consistency with the model chi-square, the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA), treating CFI and TLI at or above .95 and RMSEA at or below .06 as indicative of close fit (Hu & Bentler, 1999), and we report 95% confidence intervals for all structural parameters.

Admissibility. We inspected each solution for inadmissible estimates. In several models, most often those restricted to three waves or to smaller subsamples, the estimated variance of a random intercept reached a lower boundary at or near zero, indicating that the between- and within-school partitions could not be empirically separated for that construct with the information available. In those cases we fixed the affected random-intercept variance to 0 and re-estimated, which reduces that construct to a within-school specification while preserving the random-intercept decomposition for the remaining constructs. We identify each such case in the Results and interpret the corresponding estimates with caution.

Measurement of parent involvement. Because the available family-engagement indicators were weakly intercorrelated (see Measures), we did not model parent involvement as a common latent factor; a single-factor measurement model was not supported by the data. We instead selected the SBDM voting rate as the indicator least confounded by school composition, and, as a sensitivity analysis, re-estimated the model with the parent-teacher conference rate; this alternative specification produced an inadmissible solution and, where its parameters were estimable, likewise showed no significant within-school involvement paths (reported in the Results). Because the available family-engagement indicators were weakly intercorrelated and index distinct facets of engagement, our primary results concern school-based, governance-oriented parent participation specifically, not parent involvement in general.

Moderation by student group. To evaluate whether the within-school climate-to-suspension relation differed across student groups, we re-estimated a bivariate climate-suspension RI-CLPM separately for each group, replacing the schoolwide suspension rate with the group-specific rate (e.g., the suspension rate for Black students). We fit group-specific models rather than a single multiple-group model because the analytic subsamples differed across groups as a function of small-cell suppression, which precludes a common estimation sample.

Secondary analyses. We conducted two exploratory analyses. First, to test whether reduced suspension transmitted a prospective association from climate to attendance, we specified a trivariate RI-CLPM that

added attendance and estimated the within-school indirect path from climate through suspension to attendance, with a Monte Carlo confidence interval based on 20,000 draws (Preacher & Selig, 2012). Because attendance was reported for only three post-pandemic waves, this model was under-identified; as a specification-robust check, we estimated a two-way fixed-effects model,

$$A_{it} = \beta_1 D_{i,t-1} + \beta_2 A_{i,t-1} + \varphi_i + \delta_t + \varepsilon_{it}$$

where A_{it} is the attendance rate, $D_{i,t-1}$ is the prior-wave suspension rate, φ_i and δ_t are school and wave fixed effects, and standard errors were clustered by school. Second, to examine whether climate prospectively predicted a narrowing of disciplinary disproportionality, we computed a Black-White suspension risk gap, defined as the difference in group-specific per-student suspension rates, among schools enrolling at least 20 students in each group, and fit a two-wave cross-lagged model of climate and the gap across 2023–2024 and 2024–2025, the only consecutive waves for which both group-specific rates were reported.

Software. We conducted all analyses in *R* Version 4.3 (R Core Team, 2023). We estimated the RI-CLPMs with the *lavaan* package (Rosseel, 2012) and the fixed-effects models with cluster-robust standard errors. We interpret standardized coefficients as small (approximately .10), medium (.30), or large (.50), following Cohen (1988), while noting that within-school cross-lagged estimates in the RI-CLPM are typically smaller than their cross-sectional counterparts. Analysis code is available from the authors.

Results

Descriptive Statistics

Table 2 presents descriptive statistics and zero-order correlations among the study variables, computed on school means across waves. School climate rose modestly over the panel, from a mean index of 69.4 in 2021–2022 to 71.9 in 2024–2025, whereas the OSS rate was comparatively flat, averaging between .06 and .07 suspensions per student. At the between-school level, climate and OSS were strongly and negatively correlated ($r = -.59$), whereas parent involvement was only weakly correlated with climate ($r = .19$) and OSS ($r = -.17$). Consistent with the measurement rationale, school climate was positively associated with the proportion of students with disabilities ($r = .69$) and inversely with enrollment ($r = -.48$).

Table 2
Descriptive Statistics and Correlations Among Study Variables

Variable	M	SD	1	2	3	4	5
1. Parent involvement	.08	.08	—				
2. School climate	70.35	7.18	.19	—			
3. Suspension rate	.07	.06	– .17	– .59	—		
4. Economically disadv.	62.9	16.2	– .15	.14	.19	—	
5. Students with disability	18.7	8.2	.05	.69	– .31	.41	—
6. Enrollment	592.7	345.4	– .18	– .48	.22	– .37	– .49

Note. N = 719 schools; statistics computed on school means across four waves. Parent involvement = School-Based Decision Making council voting rate per student; suspension rate = out-of-school suspensions per student. Correlations with $|r| \geq .08$ are significant at $p < .05$.

Reciprocal Relations Among Involvement, Climate, and Discipline

Table 3 reports the RI-CLPM results. The model yielded an admissible solution with positive between-school variance for all three constructs and fit the data well, $\chi^2(39) = 76.0$, CFI = .996, TLI = .993, RMSEA = .036, SRMR = .024. The between- and within-school partitions were of comparable size for each construct: the intraclass correlations (proportion of variance located between schools) were .46 for involvement, .33 for climate, and .52 for suspension, confirming that a substantial share of the variation in each construct was within-school and therefore available to the cross-lagged parameters. At the between-school level, the random intercepts for climate and OSS were strongly and negatively correlated ($r = -.62$), indicating that schools with persistently more positive climates recorded persistently fewer out-of-school suspensions. Parent involvement was positively related to climate ($r = .31$) and negatively related to OSS ($r = -.26$) at the between-school level.

Table 3
Random-Intercept Cross-Lagged Panel Model of Parent Involvement, School Climate, and Out-of-School Suspension

Parameter	Estimate	95% CI	p
Within-school cross-lagged paths			
Climate → Suspension	– .08	[–.17, – .00]	.043
Suspension → Climate	– .03	[–.09, .04]	.438
Climate → Involvement	.04	[–.08, .15]	.510
Involvement → Climate	– .01	[–.04, .01]	.300
Suspension → Involvement	.04	[–.09, .17]	.523
Involvement → Suspension	.01	[–.03, .05]	.713
Within-school autoregressive paths			
Climate → Climate	.88	[.78, .96]	< .001
Suspension → Suspension	.73	[.41, 1.06]	< .001
Involvement → Involvement	.22	[.09, .34]	.001
Between-school random-intercept correlations			
Climate with Suspension	– .62		.005
Involvement with Climate	.31		.033
Involvement with Suspension	– .26		.007
Between-school random-intercept variances			
Involvement	.46		
Climate	.33		
Suspension	.53		
<i>Note.</i> N = 719 schools across four waves (2021–2022 to 2024–2025). Model fit: $\chi^2(39) = 76.0$, CFI = .996, TLI = .993, RMSEA = .036, SRMR = .024. Cross-lagged and autoregressive estimates and random-intercept correlations are standardized; random-intercept variances are in the within-wave standardized metric. Cross-lagged and autoregressive paths were constrained to equality across lag intervals (see text for the stationarity test). Involvement = School-Based Decision Making council voting rate.			

At the within-school level, a single cross-lagged relation was statistically significant. A within-school increase in climate predicted a subsequent decrease in OSS ($\beta = -.08$, 95% CI [–.17, – .00], $p = .043$). The effect was small: translated to the observed scale, a 1-SD within-school gain in climate (approximately 2.6 index points) corresponded to about 0.15 fewer out-of-school suspensions per 100 students, or roughly one fewer suspension per year in a school of average size. The reverse path, from OSS to

subsequent climate, was not statistically significant ($\beta = -.03$, 95% CI $[-.09, .04]$, $p = .44$). None of the within-school paths involving parent involvement approached significance in either direction: involvement did not prospectively predict climate ($\beta = -.01$, $p = .30$) or OSS ($\beta = .01$, $p = .71$), nor did climate ($\beta = .04$, $p = .51$) or OSS ($\beta = .04$, $p = .52$) predict subsequent involvement. Overall, the association of parent involvement with both climate and discipline was a between-school phenomenon rather than a within-school dynamic, whereas school climate operated as a modest within-school antecedent of exclusionary discipline.

The equality (stationarity) constraints were supported by a scaled chi-square difference test against a freely estimated model, $\Delta\chi^2(18) = 19.4$, $p = .37$, indicating that the within-school dynamics were stable across the panel; we therefore retained the more parsimonious constrained specification. As a robustness check, the interval-specific climate-to-OSS estimates from the freely estimated model were consistent with the constrained value and did not differ reliably across intervals ($\beta = -.14, -.09, -.00$; all $p > .11$).

Because parent involvement was operationalized with a single school-based indicator, we re-estimated the trivariate model substituting the parent-teacher conference rate ($N = 748$). This specification produced an inadmissible solution—the estimated covariance matrix of the latent variables was not positive definite—so its estimates must be interpreted with caution. With that caveat, the involvement paths were again non-significant (all $p > .16$): neither a within-school increase in conferences predicting subsequent OSS, nor prior climate predicting subsequent conferences, nor prior suspensions predicting subsequent conferences reached significance, whereas the climate-to-OSS path was essentially unchanged ($\beta = -.14$, $p = .04$). The conference rate is moreover confounded with the proportion of students with disabilities ($r = .34$), reflecting mandated individualized education program meetings. The within-school involvement null therefore held across the available operationalizations; we nonetheless limit our conclusions to the school-based forms of participation recorded in accountability data rather than to parent involvement in general.

Moderation by Student Group

Table 4 reports the within-school climate-to-OSS cross-lag estimated separately by student group in bivariate models. In the schoolwide model, the protective association replicated the trivariate estimate ($\beta = -.09$, $p = .024$). When the suspension rate was disaggregated by student group, however, the association was small and did not reach significance for any group: economically disadvantaged ($\beta = -.05$, $p = .14$), Hispanic ($\beta = -.05$, $p = .55$), female ($\beta = -.04$, $p = .23$), and male students ($\beta = -.04$, $p = .35$). The estimate for Black students could not be reliably recovered ($\beta = -.00$, $p = .95$); this model rested on a small, selective subsample ($n = 328$) with substantial cell suppression, and the random-intercept variance for Black student suspensions collapsed to a boundary value. The group-specific estimates were uniformly in the protective direction but individually underpowered, reflecting the smaller and partially suppressed subsamples; they provide no evidence of differential moderation, but also do not independently confirm the schoolwide effect within any single group.

Table 4

Within-School Effect of School Climate on Subsequent Out-of-School Suspension, by Student Group

Student group	n	β	p
All students	719	– .09	.024
Hispanic	396	– .05	.549
Economically disadvantaged	781	– .05	.141
Female	601	– .04	.233
Male	787	– .04	.349
Black	328	– .00	.948

Note. Each row is a separate bivariate random-intercept cross-lagged panel model of school climate and the group-specific out-of-school suspension rate. β = standardized within-school cross-lagged estimate. The estimate for Black students is not interpretable: the subsample was small and selective, small-cell counts were suppressed, and the suspension random-intercept variance reached a boundary value.

Secondary Analyses

Two exploratory analyses probed downstream and equity-related extensions. First, we tested whether reduced suspension mediated a prospective association between climate and school attendance. Because attendance rate was available for only three post-pandemic waves, the mediational RI-CLPM was under-identified, and the random-intercept decomposition was unstable across specifications. A specification-free, two-way fixed-effects model indicated that within-school increases in OSS predicted a small reduction in subsequent attendance ($\beta = -.03, p < .001$); however, the direct climate-to-attendance path was not statistically significant, and attendance was near ceiling ($M = 92.2\%$, $SD = 2.4$). We therefore regard the discipline-to-attendance pathway as directionally consistent but substantively negligible.

Second, we examined disciplinary disproportionality descriptively and prospectively. Among the 282 schools with sufficient enrollment to compute stable group-specific rates, Black students were suspended at more than twice the rate of White students ($M = .30$ vs. $.14$), with a positive Black-White gap in 233 schools (82.6%). School climate was moderately and negatively correlated with the gap cross-sectionally ($r = -.42$). In a two-wave cross-lagged model, however, climate did not statistically significantly predict subsequent narrowing of the gap ($\beta = -.07, p = .14$), an association in the expected direction but underpowered given the two available waves and the suppression of small-cell counts.

Discussion

The purpose of this study was to examine the reciprocal, within-school relations among parent involvement, school climate, and exclusionary discipline in a statewide, four-wave panel of Kentucky schools, using a model that separates stable between-school differences from within-school change.

Three findings stand out. First, at the within-school level, an increase in a school's climate, relative to its own trajectory, predicted a subsequent reduction in out-of-school suspension ($\beta = -.08$), whereas the reverse path was not supported. This effect was small but stable across the panel, as the stationarity test confirmed; we therefore characterize climate as a modest but consistent within-school antecedent of exclusionary discipline rather than a downstream consequence of it. Second, parent involvement measured as participation in site-based governance was unrelated to subsequent climate or discipline at the within-school level, and neither construct predicted subsequent involvement; this null persisted in a sensitivity analysis using the parent-teacher conference rate, although that alternative specification produced an inadmissible solution and is therefore only suggestive. Third, the schoolwide climate-suspension relation did not resolve into significant effects within individual student groups, whose smaller and partly suppressed samples afforded limited power; the group-specific estimates were uniformly protective in direction but individually inconclusive, and data suppression precluded any reliable estimate for Black students.

These findings both extend and complicate a large literature on parent involvement. That literature has established, across decades of primary studies and multiple meta-analyses, that parent involvement is positively associated with student achievement (Cosso et al., 2022; Jeynes, 2024; Kim, 2022). Our results are not inconsistent with those syntheses, but they qualify the common inference that involvement is a malleable lever for improving the broader functioning of schools. When involvement, climate, and discipline were modeled together and stable between-school differences were removed, parent involvement did not prospectively predict a school's climate or its use of exclusionary discipline. The between-school associations we observed, in which schools higher in involvement were higher in climate and lower in suspension, are consistent with prior correlational work, but they did not correspond to within-school change over time. This pattern is precisely what the random-intercept specification is designed to reveal: associations that appear among schools as stable entities need not manifest as within-school dynamics (Hamaker et al., 2015). Because the involvement literature is predominantly cross-sectional (Yang et al., 2023), it may have overstated the plausible role of school-based involvement in the behavioral environment of schools.

Two features of our approach bear on the interpretation of the involvement findings. First, the family-engagement indicators available in statewide data were weakly intercorrelated and did not form a coherent factor, consistent with evidence that parent involvement is multidimensional (Kohl et al., 2000) and that its dimensions relate differently to outcomes (Kim, 2022). A sensitivity analysis substituting the conference-rate measure yielded the same within-school null, but that specification was itself inadmissible and the conference indicator is confounded with special-education prevalence through mandated individualized education program meetings; the broader lesson is that aggregate, administratively recorded indicators capture only narrow and non-equivalent slices of a multidimensional construct. Academic socialization, which shows the strongest association with achievement (Hill, 2022; Kim, 2022), is not captured in these data at all. Our conclusions are therefore specific to the school-level, school-based involvement that accountability systems record and should not be read as evidence that family engagement is unimportant. Second, the climate-to-discipline finding is consistent with the logic

of school-wide behavioral frameworks, in which improvements to the shared climate of a school are expected to reduce reliance on exclusionary responses (Bradshaw et al., 2012; Authors, 2018). That the effect was modest, and that discipline did not reciprocally predict climate, suggests that climate functions as one proximal, malleable condition of the disciplinary environment rather than as a downstream consequence of disciplinary practice.

The moderation analyses were inconclusive at the group level. Although the schoolwide climate-suspension association replicated the trivariate estimate, it did not reach significance for any individual student group; the group-specific estimates were uniformly in the protective direction but small and underpowered, reflecting the smaller and partially suppressed subsamples. These results provide no evidence that the association is concentrated in, or absent from, any particular group, but neither do they confirm it within groups, and they should not be read as establishing an equally distributed benefit. The analysis was least able to speak to the group for whom disciplinary disproportionality is most acute: small-cell suppression and the resulting instability of estimates precluded a reliable within-school estimate for Black students, even though the descriptive disproportionality in our data was substantial, with Black students suspended at roughly twice the rate of White students. This limitation reflects a broader tension in publicly reported education data between protecting student privacy and enabling study of the students most affected by exclusionary discipline.

Limitations

Several limitations warrant mention. First, although the RI-CLPM separates within- from between-school variation and supports prospective inference, it remains an observational design, and unmeasured, time-varying confounders could contribute to the within-school associations we report. Second, the constructs were measured with the indicators available in statewide accountability data; school climate was derived from a student survey and averaged across its climate and safety components, parent involvement was limited to school-recorded participation, and suspension was a school-level count. These measures do not capture the full conceptual breadth of any of the three constructs, and the involvement measure in particular reflects only one dimension. Third, the panel spanned four post-pandemic years, and although we reconstructed and validated the earliest climate wave, the study period followed an unusual disruption to schooling, so the generalizability of the observed dynamics to other periods is unknown. Fourth, the analytic sample, though closely representative of Kentucky schools in racial and ethnic composition, enrolled somewhat larger schools and excluded a number of small and specialized schools. Finally, our secondary analyses of downstream attendance and of the Black-White suspension gap were constrained by data availability and are best regarded as exploratory.

Implications for Research

Our findings point to several directions for future research. First, the involvement null should be tested against richer measures of family engagement, particularly academic socialization, and with data that permit modeling engagement at the level at which it is theorized to operate. Second, the climate-to-discipline relation should be replicated in other states and periods and extended to more severe and

restrictive responses, such as restraint, seclusion, and referral to law enforcement, which fall disproportionately on students with disabilities. Third, and most pressingly, the field needs data infrastructure that permits the study of disciplinary disproportionality without the small-cell suppression that made a reliable estimate for Black students impossible here; secure-access data with unsuppressed counts would allow a proper within-school test of whether climate improvement narrows disciplinary gaps. Future research should replicate and extend these results by incorporating measures of implementation fidelity, so that the climate-discipline relation can be situated within the frameworks, such as SWPBIS, that schools use to improve climate.

Implications for Practice

For practitioners and policymakers, the results offer a qualified message. School climate emerged as a modest within-school antecedent of exclusionary discipline, consistent with continued investment in the school-wide frameworks and climate-focused practices that aim to reduce reliance on suspension. Parent involvement, as recorded in state accountability data, did not function as a within-school lever for climate or discipline; efforts to reduce exclusionary discipline by increasing school-based parent participation alone may therefore be misplaced, even though family engagement remains valuable for other reasons and other outcomes. We emphasize that this conclusion concerns the aggregate, school-level, school-based involvement captured in accountability systems and does not diminish the many forms of family engagement that operate at the level of individual students and families.

Conclusion

Exclusionary discipline remains a consequential and inequitable feature of American schooling, and identifying the malleable conditions that reduce it is a priority for research and practice. Using a statewide panel and a model that distinguishes stable school differences from within-school change, we found that improvements in a school's climate prospectively predicted modest reductions in its use of out-of-school suspension, a schoolwide relation that we could not reliably localize to any single student group. Parent involvement, as recorded in state data, showed no within-school relation to the behavioral environment across the operationalizations we examined. On balance, the disciplinary environment of schools appeared more responsive to their climate than to the narrow, school-based forms of parent involvement that accountability systems record. Future research should replicate and extend these findings with richer measures and with data adequate to the study of the students for whom exclusionary discipline is most consequential.

Declarations

Author Contribution

N.A.G. conceptualized the study, curated the data, conducted the analyses, and drafted the manuscript. C.R. contributed to the conceptualization, interpretation of results, and critical revision of the manuscript. Both authors read and approved the final manuscript.

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Figures

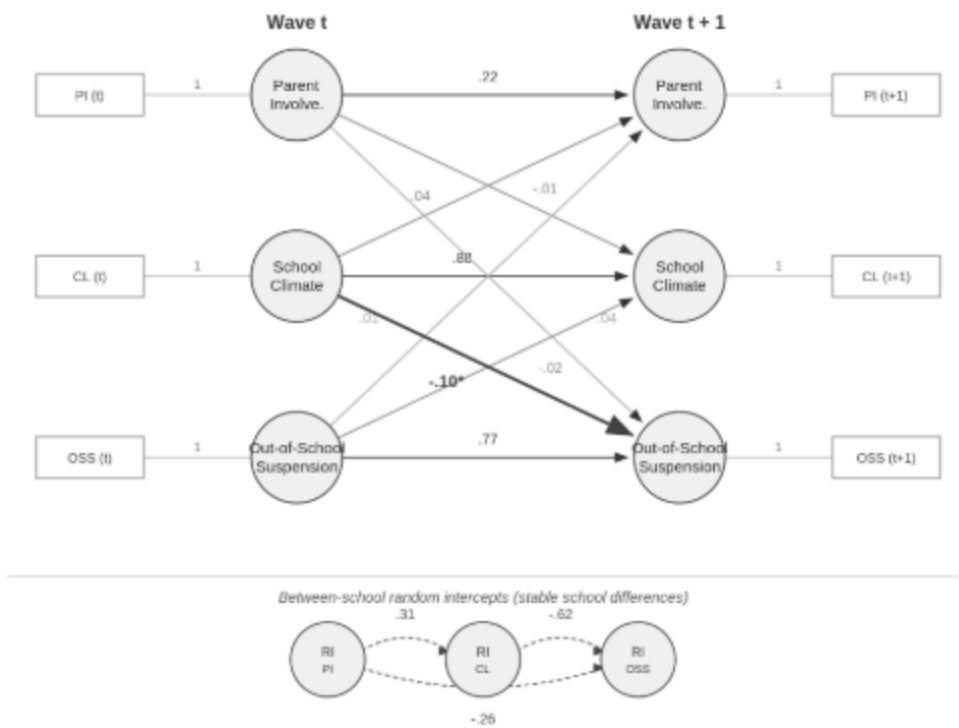


Figure 1

Random-Intercept Cross-Lagged Panel Model of Parent Involvement, School Climate, and Out-of-School Suspension

Note. Standardized estimates from the four-wave random-intercept cross-lagged panel model (N = 719 schools). Because the autoregressive and cross-lagged paths were constrained to equality across the three lag intervals, one representative interval is shown. Circles denote within-school components and squares denote observed indicators, with loadings fixed to 1; the lower panel shows the correlations among the three between-school random intercepts. The bold path (Climate → Suspension) is the only statistically significant within-school cross-lag. Within-wave residual covariances are omitted for clarity. PI = parent involvement; CL = school climate; OSS = out-of-school suspension. * $p < .05$.