

Teacher Appraisals of Occupational Wellbeing Before and After COVID-19

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Abstract

This study examined teacher's occupational health across four waves of a district-wide public school climate survey: 2019-2020 (Pre-COVID), 2021-2022 (COVID), 2022-2023 (COVID Recovery), and 2023-2024 (Post-COVID). Each wave included approximately 1800 - 1900 teachers and response rates ranged from 60 - 80%. Multi-level modeling examined teachers' self-reports of stress vulnerability, instructional support, and job satisfaction at level one across each wave. Level two was modeled at the school level and included principal turnover and free/reduced-price lunch percentage for the 47 schools in each wave (31 elementary, 10 middle, and 6 high schools). There were statistically significant increases in teacher stress vulnerability, relative to the Pre-COVID wave, for both the COVID Recovery and Post COVID waves. Instructional Support and Job Satisfaction scores, however, remained relatively stable until the Post-COVID wave, when an increase in Instructional Support was found. Most of the variance for each outcome measure, across waves and using the total sample, was at level one, although substantial variability existed between schools at level two. Free and reduced-price lunch percentage and principal turnover were associated with lower Instructional Support and Job Satisfaction. Teacher's stress vulnerability was associated with both Instructional Support and Job Satisfaction across school levels.

Keywords:

teachers, stress, school climate, occupational health, longitudinal.

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1. Introduction

K - 12 teaching can be both fulfilling and stressful (Cordaro et al., 2024). Stress can reduce teacher's occupational health through lowered job satisfaction, burnout, and eventually, reduced occupational commitment (Herman et al., 2018). The pandemic added additional sources of stress for teachers (Pressley et al., 2021) and led greater numbers to contemplate leaving the profession (Charles Butt Foundation, 2024). Given such realities, Bacher-Hicks et al. (2023) noted the importance of continued research on teacher stress and its relationship to occupational health since the pandemic.

This study was part of a Research Practice Partnership (RPP) between university researchers and a large, suburban school district in the Southwestern United States. The RPP included collaboration on four waves of a district-wide public school climate survey: 2019-2020 (Pre-COVID), 2021-2022 (COVID), 2022-2023 (COVID Recovery), and 2023-2024 (Post-COVID). School climate is broadly defined as the environment and atmosphere of the school and includes the quality of relationships amongst students, teacher, and administrators, as well as teacher and student satisfaction (Otacan, 2024). Within the broader arena of school climate, this study's focus is on teacher occupational health variables available from the RPP climate survey: teacher's risk for stress, job satisfaction, and instructional support, each of which will be defined next.

2. The revision of the speciality literature

The transactional model of stress (Lazarus & Folkman, 1984) was the primary theoretical grounding for this study, which decade after decade is cited as foundational to psychological understandings of stress (McCarthy et al., 2021). Lazarus and Folkman suggested we first make primary appraisals about the magnitude and saliency of the demands, followed by secondary appraisals of resources available for coping. Appraisals are central to transactional theory since the appraised sufficiency of resources vis-à-vis demands determines our risk of becoming stressed (Chang, 2013). The term risk for stress, used throughout this paper, reflects the notion that appraisals differ from person to person even in similar workplace environments, and therefore appraisals can, but do not always, result in the experience of stress (McCarthy et al., 2021).

An adaptation of the Classroom Appraisal of Resources and Demands (CARD; Lambert et al., 2009) was used in this study to assess teachers' appraisals of classroom demands and resources. Operationalizing the construct of risk for stress, an Appraisal Index can be created by calculating the difference between scores for the CARD Demands and Resources scales. Considerable psychometric support for the CARD has been established (McCarthy et al., 2016) and importantly for the current study, the protocol established for calculating an Appraisal Index has been replicated with nationally representative data sets (Lambert et al., 2015). Using similarly themed items for both the Demands and Resources scales, the Appraisal Index (API) was found to be associated with teacher occupational health indicators in both the nationally representative Schools and Staffing Survey (SASS; Lambert et al., 2015) and the more recent National Teacher and Principal Survey (NTPS; McCarty et al., 2021). The current study arose from our RPP in which the CARD Demands items were included in our partner district's climate survey and a Resources scale was constructed with relevant items already in the climate survey.

Along with risk for stress, this study focused on two other components of teacher's occupational health: Instructional Support (IS), a teacher's evaluation of the sufficiency of the various programs, resources, and materials provided for teachers by their institutions (Ma & Casiahn, 2024), and Job Satisfaction (JS), defined as a teacher's contentment with their work (Blömeke et al., 2017). Data for this study was analyzed across the four waves and across the same 47 school settings (31 elementary, 10 middle, and 6 high schools). We also accounted for contextual factors at the school level: principal turnover and free/reduced-price lunch percentage.

Previous research conducted in our RPP revealed several findings from each specific wave that inform the current study (Lambert et al., 2023; Tian et al. 2024; Lambert et al., 2024).

Wave 1 (pre-COVID) was the first year of collaboration and included the teacher occupational health measures described above (API, IS, and JS) from the climate survey as well as key informant ratings of principal quality and stability (Lambert et al., 2023). Wave 1 results supported research suggesting that the quality and stability of school leadership played a critical role in mitigating teachers'

vulnerability to stress (Grissom, 2011). Wave 2 was conducted in the 2021-2022 school year and results showed the influence of quality and stability of school leadership in the pandemic was less related to teacher's occupational health (Tian et al., 2024). Instead, a greater determinant was school resources as measured by free or reduced lunch percentage: in less affluent schools, teachers reported lower occupational health than in more affluent schools. These results suggested the increased importance of socio-economic factors during the pandemic, while the traditional roles of school leaders played a lesser role.

Results from Wave 3 (2022-2023) and Wave 4 (2023-2024) indicated that teacher's API was associated with both IS and JS (Lambert et al., 2024), which was a consistent finding across all waves. These associations were invariant with respect to school characteristics such as free or reduced lunch percentage and school demography in Waves 3 and 4. However, at the school level, middle school teachers reported lower levels of instructional support and that teachers working in schools with a higher concentration of children from low socio-economic backgrounds (again, measured by free or reduced lunch percentage) reported lower JS. Findings across the individual waves indicated that more variability existed in teacher appraisals with the same school rather than between schools, suggesting that, in accordance with transactional theory, individual teachers can make different appraisals of working conditions in the same school (Lambert et al., 2024).

The purpose of the current study was to examine these findings across all four waves, and for clarity, we will use refer to the 2019-2020 Wave as Pre-COVID, the 2021-2022 as COVID, the 2022-2023 wave as COVID Recovery, and 2023-2024 wave as Post-COVID. We addressed the following research questions:

1. Are there differences in teacher perceptions of classroom Demands and Resources, as measured by the Appraisal Index (API), across four waves of data collection (Pre-COVID, COVID, COVID Recovery, and Post COVID)?
2. Are teacher perceptions of classroom Demands and Resources, as measured by API, consistent across school settings?
3. Are there differences in teacher perceptions of Job Satisfaction (JS) and Instructional Support (IS) across four waves of data

collection (Pre-COVID, COVID, COVID Recovery, and Post COVID)?

4. Are teacher reports of JS and IS consistent across school settings?
5. Are teacher API scores associated with JS and IS?
6. Are the associations between API, JS, and IS consistent across school settings?

3. Research methodology

3.1 Participants

The climate survey was not administered during the 2020-2021 year to minimize burden on teachers during the pandemic. The survey remained almost identical across the waves of data collection and included questions about classroom resources and demands, school leadership and governance, teacher experiences and perceptions of working conditions, occupational stress vulnerability, instructional support, and job satisfaction. Each year, the survey was sent to all district employees. To meet the objectives of the current study, only responses from full-time classroom teachers who worked in the 47 schools which were a part of the initial wave were retained: 31 elementary schools, 10 middle schools, and 6 high schools. This included almost all schools in the district, except for a few smaller specialty schools and a few new elementary schools that opened after the first wave of the study.

The basic structural characteristics for these schools did not change substantially across the waves of data collection (see Table 1). During the first wave, pre-COVID, schools ranged in size from just over 300 students for the smallest elementary school to just over 3,500 for the largest high school (mean=1,006.17, SD=709.94). The overall response rate for the Pre-COVID wave was 80.50%, yielding 1,850 full time classroom teachers. As was the case for each wave, and is true for the national workforce, the majority described themselves as female and White. Table 1 contains demographic information for all four waves. The response rates for subsequent years were 67.60% for the COVID wave, 65.20% for the COVID Recovery wave, and 60.14% for the Post-COVID wave.

For each wave of the study, researchers documented whether the school principal remained the same or was replaced. Most of the schools experienced at least one principal change during the study (see

Teacher Appraisals of Occupational Wellbeing Before and After COVID-19
Chris J. McCarthy, Richard G. Lambert, Yijie Tian, Ruqhia M Syed

Table 1). Of the 47 participating schools, 31.9% retained the same principal across the five years of the study. Only 35.5% of the elementary schools, 20.0% of the middle schools, and 33.3% of the high schools did not experience a change in leadership.

Table 1. Characteristics of Teachers and Schools

Level 1: Teacher Characteristics

	Wave 1 (%)	Wave 2 (%)	Wave 3 (%)	Wave 4 (%)
Female	78.1	80.6	79.6	78.5
Male	21.9	19.4	20.4	21.5
Asian (AN)	3.8	4.5	4.5	5.3
Black (BL)	4.7	3.9	4.5	3.1
Hispanic (HS)	16.3	16.3	17.6	17.4
Multiracial (MR)	1.8	0.9	1.2	1.5
Native American (NA)	2.8	0.7	0.5	0.1
White	70.6	73.7	71.6	72.4

Level 2: School Characteristics

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Wave 1 (Pre-COVID)				
School size (number of students)	1006.17	709.94	335	3501
Free or reduced lunch percentage	33.04	23.45	2.7	81.38
Students of color percentage	43.46	22.48	8.24	83.09
Wave 2 (COVID)				
School size (number of students)	969.77	756.55	322	3731
Free or reduced lunch percentage	28.82	20.67	1.82	71.5
Students of color percentage	43.19	22.59	8.49	85.42
Wave 3 (COVID Recovery)				
School size (number of students)	1,006.17	709.94	335	3,501
Free or reduced lunch percentage	28.82	20.67	1.82	71.5
Students of color percentage	43.19	22.59	8.49	85.42
Wave 4 (Post-COVID)				
School size (number of students)	922.26	729	195	3,746
Free or reduced lunch percentage	34.79	24.03	3.48	78.79
Students of color percentage	44.08	23.78	9.2	89.08

It is important to note that responses to each wave of the survey were confidential and anonymous. Therefore, we could not match responses from the same individuals across waves, and the responses from all waves were combined. Therefore, we treated the responses as coming from a multiple panel study. The basic unit of analysis at Level 1 in the models was an individual teacher responding to the survey during a particular wave of data collection.

Approximately half of the responses across the waves came from teachers who worked in elementary schools ($n=3,537$, 49.5%), followed by 30.7% from teachers who worked in high schools ($n=2,194$), and 19.8% from teachers who worked in middle schools ($n=1,416$). These numbers are consistent with the number of schools in each category and with the typical size of the faculty in each school type, suggesting relatively equal response rates across school types.

3.2 Measures

All scale scores involved in the analyses were constructed from the responses to each wave of the district-wide climate survey. Scoring strategies based on the Rasch Partial Credit Model were used to create scale scores and paralleled those used by the research team in previous analyses of data collected within the partnership (Lambert et al. 2023, Tian et al. 2024; Lambert et al., 2024). For details regarding the development of the scale scores, see Lambert et al. (2023). The survey measure consisted of over 100 items focusing on teacher perceptions regarding multiple dimensions of school environment. Participating teachers responded to survey items by rating their agreement with a series of statements using a five-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree.”

Both classical and Rasch-based reliability statistics are reported and values greater than or equal to .80 were considered adequate. Cronbach’s alpha and McDonald’s omega are reported for each wave of data collection. Rasch person and item reliability as well as person item separation indexes are reported by wave. Separation indexes greater than equal to 2.00 are considered adequate (Bond & Fox, 2001). The variance accounted for by the factor solution is also included by wave.

The Instructional Support (IS) scale includes 10 items that focus on teacher perceptions of the extent to which they feel supported by specific instructional resources available in their school. Sample items include “I can describe how the available professional development supports achievement of my instructional growth goals,” “My school administrators give teachers specific ideas for how to improve instruction,” and “Teachers at our campus are encouraged to use innovative instructional practices.” Cronbach’s alpha values (.91 - .94)

and McDonald's Omega values (.88 - .92) were all in the acceptable range. All Rasch-based values were also in the acceptable range: Person reliability (.86 - .89), Person Separation Index (2.46 – 2.84), Item reliability (.98 - .99), and Item Separation Index (7.60 – 11.44). The factor analysis results indicate most of the variance was accounted by the measure across the waves.

The Job Satisfaction (JS) scale includes 7 items that focus on a teacher's global sense of contentment with the conditions of employment. Sample items include: "Most teachers at this campus teach their classes with great enthusiasm." And "Most teachers at this campus feel engaged in their work." Cronbach's alpha values (.90 - .92) and McDonald's Omega values (.90 - .92) were all in the acceptable range. All Rasch-based values were also in the acceptable range: Person reliability (.86 - .89), Person Separation Index (2.49 - 2.83), Item reliability (.99 for all waves), and Item Separation Index (13.50 – 18.10). The factor analysis results indicate most of the variance was accounted by the measure across the waves.

The Classroom Demands (Demands) scale includes 11 items that focus on a teacher's appraisal of the magnitude of demands related to serving the students in their classroom. Sample items include: "In my classroom, the lack of instructional resources and materials is demanding." and "In my classroom, administering district and state assessments is demanding." Cronbach's alpha values (.89 - .92) and McDonald's Omega values (.88 - .92) were all in the acceptable range. All Rasch-based values were also in the acceptable range: Person reliability (.84 - .90), Person Separation Index (2.33 – 2.92), Item reliability (.99 for all waves), and Item Separation Index (15.49 – 18.70). The factor analysis results indicate most of the variance was accounted by the measure across the waves.

The Classroom Resources (Resources) scale includes 23 items and focuses on a teacher's appraisal of the resources their school provides to meet the demands of their classroom. Sample items included: "I receive useful and constructive feedback about my performance from my school administrators.", "Professional development that is relevant to my instructional growth goals is available to me." and "Teachers receive the support they need for students with special needs." Cronbach's alpha values (.96 - .98) and McDonald's Omega values (.96 - .98) were all in the acceptable range. All Rasch-based values

were also in the acceptable range: Person reliability (.92 - .95), Person Separation Index (3.37 - 4.21), Item reliability (.98 - .99), and Item Separation Index (7.23 - 9.33). The factor analysis results indicate most of the variance was accounted by the measure across the waves.

The Appraisal Index (API) was created by calculating the difference between scores for Demands and Resources, following the protocol established by McCarthy et al. (2016). The index showed strong reliability based on the data across the four waves of data collection (.93 - .96) as determined by Crocker and Algina's (1986) formula for the reliability of difference scores. As explained in Lambert et al. (2023), the API captures the extent to which teachers perceive resources provided by their school are adequate to meet classroom demands. This composite score serves as an overall measure of risk for occupational stress. It is not a direct measure of the physiological stress response. However, a long line of research has demonstrated associations between AI scores and a range of occupational health outcomes (McCarthy et al. (2016). Positive scores indicate that perceived demands exceed available resources, reflecting a higher risk for stress, while negative scores suggest that resources are sufficient, indicating a lower stress risk.

3.3 Analyses

Multi-level models were estimated using the HLM software package to test the research questions. The level one (L1) unit were the teacher responses to a particular wave of data collection ($n = 7,147$). The level two (L2) units consisted of the 47 schools, which contributed an average of 152.06 teacher responses per school to the total L1 sample ($SD = 104.94$, range = 53 - 530 teacher responses). The scale scores for the API, IS, and JS were used as the L1 outcome measures. To assess whether there was sufficient variance between schools to justify the use of multilevel modeling (MLM), researchers first tested unconditional models, which did not include any covariates or explanatory variables for each outcome measure. For all three measures, across each wave and using the total sample, most of the variance in teachers' responses was between teachers within the same school (see Table 2). This finding confirms the central tenet of the transactional model as applied to occupational stress, that individual appraisals of working conditions are central to the stress response

(Chang, 2013) and matter even more than actual differences in work settings.

A substantial minority of the variance in each outcome measure, across waves and using the total sample, was found to be between schools. For API the intraclass correlation coefficients (ICCs) ranged from .126 to .161 across the waves and equaled .118 using the total sample. This finding indicates that 88.2% of the variance in API scores lies between teacher responses within school while 11.8% of the variance in this variable lies between school settings. For IS, the ICCs ranged from .160 to .215 across the waves and equaled .149 using the total sample. For JS, the ICCs ranged from .247 to .341 across the waves and equaled .218 using the total sample. For each measure, between school variance was greatest (or very close to the greatest for API) for the Pre-COVID phase and smallest for the COVID phase. In addition, for each outcome measure, the ICCs for the total sample were smaller than in any particular wave. This finding illustrates how the total sample L1 data, teacher responses to a particular wave of data collection, included both between teacher differences and between wave differences due to changing contextual conditions across time. Taken together, these findings demonstrated sufficient between school variance to justify the use of multilevel modeling.

Paralleling Lambert et al. (2023), conditional models at L1 were examined, incorporating teacher gender and race/ethnicity as covariates. All L1 predictors and covariates were group-mean centered, so that the L2 intercepts would represent the school-level means for each outcome. To test research questions 1 and 3, group mean centered dummy coded variables were included to represent each wave with the pre-COVID phase as the baseline. A dichotomous variable was included that indicated whether the teacher was responding during a wave in which the principal had changed going into the current academic year. To test research 5, API was added as a predictor to the models with IS and JS as outcomes.

At L2, multiple conditional models were tested with grand mean centered predictors: school level (elementary, middle, or high) and the percentage of students eligible for free or reduced-price lunch. Elementary school status was the baseline condition. To test research questions 2, 4, and 6 pertaining to the consistency of findings across

school contexts, the researchers examined the associations between school characteristics and the parameter estimates from the L1 models.

Specifically, conditional models were used to examine associations between school characteristics and the model-estimated school means for each outcome. They were also included to examine associations with the slopes that describe the relationship between the outcome measures (JS and IS) and API, wave of data collection, and whether the school had experienced a recent principal change. The slopes for each wave of data collection were modeled as randomly varying to account for the distribution of slopes across schools. The slope associated with principal change was modeled as non-randomly varying to recognize the smaller variance in these slopes across schools. The slopes associated with teacher covariates were modeled as fixed effects. Appendix A contains the exact model specification.

4. Results

Addressing Research Question 1 (RQ1), the results from the multilevel model with API as the outcome measure indicate that the average AI score increased relative to the Pre-COVID wave across the remaining three waves (see Table 2). This increase was statistically significant for the COVID Recovery and Post COVID waves, indicating increasing risk for occupational stress after the pandemic. To address RQ2, we tested whether these differences were consistent across school settings. There was a large, statistically significant increase for middle schools from the pre-COVID wave to the COVID wave. In addition, the school level free and reduced-price lunch percentage was associated with higher mean API scores. This percentage was also statistically significantly associated with the magnitude of the effect for a recent principal change. Schools with higher concentrations of students from economically disadvantaged backgrounds experienced higher increases in API scores when they also experienced a recent principal change. With respect to the covariate effects, male teachers and Black teachers reported, on average, lower API scores.

Table 2. Teacher, wave, and school characteristics associated with Appraisal Index scores

Level 2 School Effects

Teacher Appraisals of Occupational Wellbeing Before and After COVID-19

Chris J. McCarthy, Richard G. Lambert, Yijie Tian, Ruqhia M Syed

				Middle School			High School			FRL Percentage		
Level 1												
Wave	Coef	se	p	Coef	se	p	Coef	se	p	Coef	se	p
Effects	f.			f.			f.			f.		
Pre-COVID	-	8.95			22.7			26.2		0.38		
D	9.32	3		-11.8	6		-0.43	9		1.03	8	*
COVID	5.59	6.71		50.6	17.6	**	8.65	17.3		0.29		
D	5	5		8	6	*	2	2		0.04	6	
COVID												
D												
Recovery	20.4	9.04		29.6	22.3		22.6	24.9		0.45	0.39	
Post	9	2	**	1	8		1	7		3	6	
COVID	29.7	10.6			26.7		19.2	30.9		0.19	0.46	
D	7	1	***	-2.14	3		6	8		5	2	
Principal												
Change	5.86	7.20			17.5			17.0		0.79	0.31	*
e	4	4		-0.08	9		-21.3	5		2	1	*
Level 1 Teacher Characteristics												
	-		***									
Male	26.6	4.43	*									
		8.64										
Black	-25	1	***									
Hispanic	-	4.57										
	4.59	2										

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$,

**** $p < 0.001$.

In response to RQ3, the results from the multilevel model with IS as the outcome indicate that the average IS score remained relatively stable until the Post-COVID wave when there was a statistically significant increase (see Table 3).

Continuing with results using IS as the outcome, for RQ 4, the researchers tested whether these differences were consistent across school settings. Teachers who taught in both middle schools and high schools reported statistically significantly lower average IS scores than elementary teachers during the Pre-COVID wave.

The overall increase in scores during the Post-COVID wave was even larger for teachers in middle schools and this increase was statistically significant. In addition, the school level free and reduced-price lunch percentage was statistically significantly associated with

Teacher Appraisals of Occupational Wellbeing Before and After COVID-19
Chris J. McCarthy, Richard G. Lambert, Yijie Tian, Ruqhia M Syed

lower mean IS scores. Teachers working in a school with a recent principal change also reported lower average IS scores.

With respect to RQ5 and 6 for IS, API scores were statistically significantly associated with IS and this relationship was generally consistent across school levels. However, teachers who taught in schools with high concentrations of students from economically disadvantaged backgrounds reported API scores that were even more predictive of their IS scores than did teachers in more affluent contexts and this interaction effect was statistically significant. In other words, the slopes for the relationship between the API and IS were steeper for high poverty schools. With respect to the covariate effects, male teachers reported, on average, higher IS scores.

Table 3. Teacher, wave, and school characteristics associated with Instructional Support scores

Level 1 Wave Effects	Level 2 School Effects											
	Middle School			High School			FRL Percentage					
	Coef f.	se	p	Coef f.	se	p	Coef f.	se	p	Coef f.	se	p
Pre- COVID	507. 49	5.16 8	*** *	- 7	13.0 85	** *	- 6	15.3 17	** *	- 4	0.22 4	* *
COVID	2.94 6	3.96 8		4.10 3	10.2 73		3.07 7	10.7 78		0.20 9	0.17 5	
COVID Recove ry	1.22 1	4.02 5		8.52 6	9.89 1		0.36 7	10.6 81		-0.18 7	0.17 7	
Post COVID	8.59 2	3.73 9	**	20.3 72	9.50 2	**	4.18 6	10.0 89		0.09 8	0.16 4	
Princip al Change	- 8.99 2	- 3.43 7	- ***	- 10.7 96	- 8.28 3	-	- 14.6 67	- 9.20 1	-	- 0.03 1	- 0.15	-
Level 1 Teacher Characteristics												
Apprais al Index	- 0.44 6	- 0.00 8	- *** *	- 0.03 2	- 0.02 1	-	- 0.02 7	- 0.02 1	-	- 0.00 1	- 0	- * *
Mal e	6.32 4	2.25 4	***									
Blac k	5.01 2	4.39 7										
Hispan ic	- 4.58 8	- 4.57 2										

* p < 0.1, **p < 0.05, ***p < 0.01, ****p < 0.001.

Returning to research question 3, this time using JS as the outcome variable, the results from the multilevel model indicated that the average JS scores remained relatively stable across the waves (see Table 4). To address research question 4, the researchers tested whether JS was consistent across school settings. The school level free and reduced-price lunch percentage was statistically significantly associated with lower mean JS scores. Teachers working in a school with a recent principal change reported lower average JS scores. With respect to research questions 5 and 6 for JS, API scores were statistically significantly associated with JS and this relationship was consistent across school levels. With respect to the covariate effects, male teachers reported, on average, higher JS scores.

Table 4. Teacher, wave, and school characteristics associated with Job Satisfaction scores

Level 2 School Effects												
				Middle School			High School			FRL Percentage		
Level 1 Wave Effects	Coef f.	se	p	Coef f.	se	p	Coeff .	se	p	Coef f.	se	p
Pre- COVID	-	7.31	***	-	18.3		-	22.0		-	0.31	***
	506	5	*	7	96		2	7		3	7	*
COVID	-	4.69		-	12.2		-	13.0		-	0.20	
	3.01	2		0.08	07		3.55	95		-0.11	6	
COVID Recovery	-	5.18		-	12.7		-	14.6		-	0.22	
	4.81	4		0.86	71		-4.72	16		0.13	9	7
Post COVID	-	5.29		-	13.3		-	15.4		-	0.23	
	4.47	6		0.04	34		11.4	76		0.15	8	
Principal Change	-	4.24		-	10.7		-	10.3		-	0.18	
	7.68	9	*	14.1	87		14.8	48		0.18	1	
Level 1 Teacher Characteris tics												
Appraisal Index	-			-			-			-		
	0.42		***	0.03	0.02		0.01	0.02				
	1	0.01	*	6	4		9	6		0	0	
Male	6.31	2.24										
	9	7	***									
Black	6.34	4.40										
	8	6										
Hispanic	2.42	2.31										
	3	7										

* p < 0.1, **p < 0.05, ***p < 0.01, ****p < 0.001.

5. Discussion

Teaching has long been recognized as a demanding profession (Cordaro et al., 2024), and prolonged stress can impact teacher's occupational health in myriad ways (Herman et al., 2018). The pandemic added additional sources of demands for teachers (Pressley et al., 2021) and continuing research is needed to understand how stress is related to teacher's occupational health since COVID-19 (Bacher-Hicks et al., 2023). Findings for RQ1 indicated that teacher's risk for stress did increase following the pandemic, which could be due to challenges in teaching students whose academic and socio-emotional health were impacted by school closures (Charles Butt Foundation, 2024; Pressley et al., 2021). Importantly, results for RQ2 showed that risk for stress was more acute in middle schools from the pre-COVID wave to the COVID wave. This supports previous research suggesting that middle school teachers face numerous external demands (e.g., testing, expectations from parents and administrators; Wink et al., 2024) which could have been exacerbated in the COVID wave, although it is important to note that in subsequent waves middle school was not statistically different from other levels.

As predicted, school level free and reduced-price lunch percentage was statistically significantly associated with higher API scores and lower mean scores for IS and JS. This finding is consistent with research attesting to the unique challenges teachers faced in the aftermath of the pandemic in supporting students in low socioeconomic communities (Parthasarathy et al., 2022). Supporting previous findings from our RPP (Lambert et al., 2023), the unconditional models across the waves showed more variability between schools before COVID and more between teachers within schools after COVID. This supports a central notion of transactional theory, namely that appraisals differ from person to person even in similar circumstances (Chang, 2013). The results for our ICC's indicate even more individual variation between teachers in the years following the pandemic, which suggests teachers appraised the ongoing socio-emotional challenges with students following the pandemic differently (Collie & Mansfield, 2022).

Findings for RQ 3 and 4 indicated that both IS and JS remained relatively stable until the Post-COVID wave, when an

increase in IS was found. The latter finding could be encouraging as it reflects a gradual recalibration of teacher support after the pandemic had receded. It is important to note that while teachers were appraising local work conditions after the pandemic as more demanding (RQ 1 and 2), JS and IS scores were relatively consistent across these waves, perhaps reflecting the more global nature of these constructs (Blömeke et al., 2017; Ma & Casiahn, 2024). Findings for RQ 5 and 6 did support a relationship between API, IS, and JS, but clearly these different indicators of occupational health did not move in tandem across the waves. This information could be important for teacher retention given findings that teachers are increasingly considering leaving the field (Charles Butt Foundation, 2024) - even if IS and JS are high at a given campus, it could be important for campus leaders to take a close look at how their teachers are viewing demands and resources, since appraisals could be seen as a “leading edge” indicator of when occupational health is threatened (Lambert et al., 2023).

6. Conclusions

Grissom (2011) noted the challenges associated with staffing schools in lower income communities, the very settings in which stable staffing is most important. Our findings support this unfortunate reality: while there was no overall association between principal change and API scores, there was an interaction effect suggesting that the negative effect of principal change on API was higher in schools with larger percentages of free and reduced cost lunches. We also found an interaction effect for teachers who taught in schools with high percentages of free and reduced cost lunches: Appraisal Index scores were even more predictive of their Instructional Support scores than for teachers in more affluent contexts. These findings signal the importance of better resourcing for economically disadvantaged communities.

Several limitations and future research directions should be noted. While the teachers participating in each wave of the climate study were from the same district, the survey was anonymous, and thus we could not match individual respondents across waves. Future research could match across waves would allow for stronger conclusions about causality. Further, we were limited to the constructs available in the climate survey, and future research of this type could

be conducted with other variables important to teacher's occupational health, such as teaching efficacy and autonomy, as well as support from other school personnel and administrators. With respect to the covariate findings, male teachers reported higher IS scores and male and Black teachers reported lower AI scores, but we did not have sufficient representation in this study to interpret such findings.

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