School Start Times and Teacher Satisfaction:

A National Study by a Practicing Teacher

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Abstract:

Teachers can provide critical input for school leaders, but often feel left out of policy decisions. Teachers included in policy conversations feel valued, improving staff retention. More high schools are considering starting classes later in the morning, adapting to adolescent circadian rhythms to improve student achievement and behavioral health. Analyzing public school teacher responses from the 2017-18 National Teachers and Principals Survey (n = 44,320), this study found that teacher's job satisfaction was related to school start times and end times. Other factors positively affecting teacher satisfaction were professional development, colleague collaboration, and salary. These findings affirm the need to communicate with teachers while considering policy changes to address staff needs, provide transparency in decisions, and improve satisfaction and retention.

Objectives and Purpose

An increasing number of school districts have considered and/or adopted schedule modifications. Some districts adopted extended school calendars (McMullen & Rouse, 2007; Finnie, et al., 2019) or four-day school weeks (Anderson & Walker, 2015; Turner, Finch, & Ximena, 2018; Thompson, et al., 2021; Morton, 2021), but the most widely discussed schedule changes involve delaying school start times for adolescent students in order to better match their circadian rhythms. While there has been extensive research on the impact later school start times have on academic achievement and student behavioral health, there has been limited research on the impact later start times has on teachers.

Changes to school bell schedules can affect teacher commutes and childcare arrangements, and thus potentially influence their job satisfaction. In general, evidence suggests teachers are left out of school policy discussions, which can affect their satisfaction (Nelson, 1994; Jackson, 2012; Ingersoll, Sirinides, & Dougherty, 2018; Shannon & Saatcioglu, 2018).

With teacher turnover especially prevalent in academically challenged schools and schools with higher percentages of economically disadvantaged students (Holme, et al., 2017; Miller & Reynolds, 2022; Carver-Thomas & Darling-Hammond, 2017), teacher retention and job satisfaction are important issues. Using data from the US Department of Education/NCES 2017-18 National Teachers and Principals Survey, we considered the relationship between teacher satisfaction and start and end times.

Theoretical Framework

There is considerable research suggesting that adolescents have a different circadian rhythm than adults and younger children, with evidence that teenagers naturally fall asleep and

wake later than in other stages of life (Carskadon et al., 1980; Carskadon et al., 1997). Additional research shows that social jet lag – the negative impact of "catching-up" on sleep over the weekend on re-establishing a sleep schedule Sunday and Monday nights – is more pronounced in adolescents (Wittmann et al., 2006; Touitou, 2013). While research suggests adolescent sleep is disrupted by screen time, studies which control for use of electronic devices re-affirm the differences in adolescent circadian rhythm (Hale & Guan, 2015; Pignolet & Moore, 2021; Troxel & Wolfson, 2017).

Some research suggests a positive relationship between later start times and high school student achievement (Wahlstrom et al., 1998; Miller, et al., 2008; Carrell et al., 2011). However, some studies found later start times had limited academic impact (Hinrichs, 2011; Heissel & Norris, 2018; Edwards, 2012; Dunster et al., 2018). There appears to be stronger evidence suggesting later SST has a positive impact on the behavioral health of adolescents, with less reported anxiety and depression on a percentage basis than students in schools with later school start times SST (Wahlstrom, 2002; Lufi et al., 2011; Owens et al., 2010; Peltz et al., 2017). Such behavioral health benefits can explain the modest academic benefits found in the research cited above.

While advocates for later start times point to the student benefits, the logistical implications of changing start times quickly emerge in the forefront of policy discussions. Concerns regarding transportation, extra-curricular programs, and after-school responsibilities of HS students (such as childcare and part-time jobs) weigh heavily on decisions on school schedules (Wahlstrom, 1999; Wolfson & Carskadon, 2005).

There is limited research on the impact of start times on teachers, but other studies have raised concerns about the quality of teachers' sleep. A study in a rural Indiana school district found 43% of teachers reported six hours of sleep or less per night and 64% of teachers reported being drowsy during the day for "some," "a good bit," or "most of the time" (Amschler & McKenzie, 2010). Evidence suggests that state policies requiring state approval of curriculum, performance-based pay, and other accountability measures are associated with teachers reporting fewer than 5.5 hours of sleep per night (Fujishiro et al., 2017). Studies in the UK, Malaysia, and Turkey found a strong positive relationship between teachers who reported sleep deficiencies and teachers who reported burnout (Cropley et al., 2006; Merey et al., 2013; Yusof, 2012).

Discussion of increased teacher burnout and attrition has increased recently (Holme et al., 2017; Miller & Reynolds, 2022), and school leaders have been eager to identify and implement strategies to attract and retain staff (Carver-Thomas & Darling-Hammond, 2017). Perhaps it is time to consider how scheduling affects teachers to address these concerns, similar to how employers in other sectors have been adapting work arrangements to support their staff (Autonomy Research, 2023; Kaplan & Ayette, 2023; Lehman, 2023).

Data Source & Methods

Secondary analysis uses existing data with more breadth and depth than a researcher could collect individually (Johnston, 2014; Smith, 2008). The National Teachers and Principals Survey (NTPS), formerly the School and Staffing Survey, is administered every 3-4 years. The 2017-18 NTPS was composed of a nationally representative sample of 44,320 practicing K-12 public school teachers (NCES, 2019). Teacher responses were linked to corresponding responses

to surveys of their school and their school principal. Specifically, this linked the school start time, school end time, and other school characteristics to teacher responses.

Of the 61 survey items for teachers on the 2017-18 NTPS, a scale capturing teacher satisfaction was developed by aggregating the Likert responses (strongly disagree to strongly agree) to the following items:

> *To what extent do you agree or disagree with the following statements about your work at this school?*
> a. *The stress and disappointments involved with teaching at this school aren't really worth it.*
> b. *The teachers at this school like being here; I would describe us as a satisfied group*
> c. *I like the way things are run at this school*
> d. *If I could get a higher paying job I'd leave teaching as soon as possible.*
> e. *I think about transferring to another school.*
> f. *I don't seem to have as much enthusiasm now as I did when I began teaching.*
> g. *I think about staying home from school because I'm too tired to go.*
>
> (NCES, 2018, p. 28)

This teacher satisfaction scale ranged from a low of 7 to a high of 28 with a mean of 20.86. This scale was entered into the analyses as the dependent variable. The descriptive statistics for these and the other variables are shown in **Table 1**.

Table 1 *Variables included in the regression*

Regression variable	Mean / Proportion	Standard deviation	Range
Teacher PD scale	21.496	4.679	7–28
Teacher collaboration scale	18.304	3.93	7–28
Teacher age	43.3	11.32	20–99
≤ 3 years teaching experience	.148		
Teacher base salary	$55,992.70	$18,320.78	$10,000–$195,000
Coach/Activity sponsor	.434		
Male principal of school	.470		
Private school prior year	.004		
Charter school	.104		
School offers tenure	.572		
School start time	8:06 AM	0:29	7:00 AM–9:40 AM
School end time	3:02 PM	0:34	11:00 AM–6:00 PM
Teacher performance pay	.128		
Female teacher	.744		
(Constant)	20.86	4.81	7–28

Regression analysis allowed us to quantify the strength of association between teacher satisfaction and start times and end times while controlling for these other factors. Initially, we thought that school start time would be related to school end time. The moderately strong positive correlation of .584 proved this to be true.

To really appreciate regression results, it is important to understand what statistical significance and "controlling for" mean. If a relationship is statistically significant (small p value), the hypothesis of no relationship between that variable and the dependent variable is rejected. Thus, the variables are related. Each of the independent variables is assessed individually. If a relationship has been determined, the regression coefficient is considered to determine direction and size of the relationship "controlling" for all other variables that have been entered into the analysis. For example, in the regression at hand, all other things equal (meaning each of the other variables have the same value – whatever it is), for $10,000 of increased teacher salary, respondents reported an average increase of .033 points on the satisfaction scale.

The regression registered a R^2 value of .183, indicating that 18.3% of the variation in the teacher satisfaction scale is explained by the independent variables taken together. Our multivariate regression found teacher satisfaction was statistically significant with both start and end times. For each minute later classes started, the average response was .004 higher on the teacher satisfaction scale. This regression also found a statistically significant negative association between school end time and teacher satisfaction, with a .004 decrease in satisfaction scale responses for each minute later classes ended. See Table 2 for more details. See **Table 2** for further details.

Table 2 *Regression of teacher job satisfaction scale by variable*

Regression variable	Regression coefficient (B)	Beta	t
Teacher PD scale	0.416	0.406	86.707***
Teacher collaboration Scale	0.019	0.015	3.257***
Teacher age	0.032	0.077	14.970***
≤ 3 years teaching experience	0.676	0.050	10.061***
Teacher base salary (per $10k)	0.033	0.013	2.451*
Coach/Activity sponsor	0.214	0.022	4.813***
Male principal of school	0.442	0.046	10.069***
Worked at private school prior year	0.734	0.010	2.130*
Charter school	0.226	0.015	3.084**
School offers tenure	0.506	0.052	10.471***
School start time (per minute)	0.004	0.023	4.059***
School end time (per minute)	− 0.004	− 0.029	− 4.975***
Teacher performance pay	− 0.414	−0.030	− 6.221***
Female teacher	− 0.290	− 0.027	− 5.749***
(Constant)	12.109		13.462

$R^2 = 0.183$, *F stat* = 640.565, *p* < .001
*p < .05, ** p < .01, *** p < .001

Significance

The NTPS never directly asked teachers how they felt about their school's schedule, but using the stated start and end times, the study found statistically significant relationships between teacher satisfaction and school start time and end time. While later school start time does have a positive association with teacher satisfaction, the benefits of starting later for teachers fade away if it pushes back the end of the school day. Also, regression found that teacher engagement with professional development had the strongest positive association with teacher satisfaction. See **Table 3** for further details.

Table 3: *Summary Variables, Expected Relationships, and Found Relationships*

Variable	Expected Relationship	Findings
Scale of teacher participation in PD activities	High PD score could mean either high satisfaction or low satisfaction as teacher looking to improve chances of leaving	Strong positive relationship
Scale of teacher responses to questions regarding colleague collaboration	High collaboration score could mean high satisfaction	Moderate positive relationship
Teacher age	Older teachers have higher satisfaction, as dissatisfied younger teachers leave the profession	Moderate positive relationship
Whether the respondent had three or more years teaching experience	More experienced teachers have more realistic views on teaching	Moderate positive relationship
The base salary of the teacher (measured in $10,000 increments)	Entered as a control, could be confounding factor	Moderate positive relationship
Whether the respondent supervises extra-curricular sports/activities	More involvement opportunities, more satisfied	Moderate positive relationship
School principal's gender	Entered as a control, could be confounding factor	Moderate positive relationship
Whether the respondent moved from a private school to public school in past year	Entered as a control, could be confounding factor	Moderate positive relationship
Whether the respondent worked in a charter school	Entered as a control, could be confounding factor	Moderate positive relationship
Whether the respondent's school offers tenure	Entered as a control, could be confounding factor	Moderate positive relationship
School start time of respondent's school (from corresponding school survey)	Primary research focus	Strong positive relationship
School end time of respondent's school (from corresponding school survey)	Primary research focus	Strong positive relationship
Whether the respondent's school links teacher pay to student achievement	Entered as a control, could be confounding factor	Moderate negative relationship
Respondent's gender	Entered as a control, could be confounding factor	Male teachers are less satisfied

There were limitations with this study, most notably a low coefficient of determination (R-Square = .183) implying the regression only explains an estimated 18.3% of variability in responses which made up the teacher satisfaction scale. As there is limited research on the role of school schedules on teacher satisfaction, this regression still provides enough empirically valid data to begin the conversation of the relationship between these variables.

This study was designed to remove personal biases as best as possible. Most studies on the impact of start time on teachers involve surveys taking place shortly before or after a change in SST. By matching the NTPS teacher surveys to the NTPS school and principal surveys, this study was able to run statistical tests on the influence of school start times on teacher satisfaction without asking faculty direct questions which could be perceived as loaded and/or leading.

The 2020-21 NTPS data was released after this study was completed; therefore, this study could be replicated with more recent data, with limitations of COVID abnormalities that school year. In addition to replicating questions which made up our teacher satisfaction scale, the 2020-21 NTPS included questions not asked in previous questionnaires, allowing for further analysis of the relationship between school schedules and teacher well-being. Specifically, the 2020-21 NTPS directly asked teachers how many hours of sleep they get on an average school night, allowing for a comparison of teacher sleep to school start times (NCES, 2022).

Successful school policy initiatives rely on staff support and implementation with fidelity. Administrators can build such support and boost morale among their faculty by giving teachers voice in school policy, such as schedule changes and professional development. Such dialogue allows administrators to learn teachers' concerns with policy changes and allows leaders to address apprehensions with transparent data.

This study also has significance for state policymakers, as a growing number of states consider state-wide mandates for high school classes to begin after 8:30 AM (Hursh, 2019). While legislators proposing such bills point to research on adolescent sleep, they must consider the positive and negative implications schedule changes could have on teachers. State-wide schedule changes should only be considered with teacher input, either through collaboration with union representatives or forming teacher committees to review the impact on their profession.

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