RESEARCH
Original Research

A Mixed-Methods Evaluation of a School Wellness Initiative: An Examination of Longer Lunch Periods and More Physical Activity Opportunities

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ABSTRACT

Background There are currently no national standards for lunch period lengths or physical activity in schools. Research is needed to better understand the impact of school initiatives that improve policies related to lunch and movement opportunities on student outcomes. Additionally, best practices are necessary to support schools that are considering initiatives that address these factors.

Objective This study examined the impact of implementing longer lunch periods, recess, and other movement opportunities on student outcomes and best practices for implementation.

Design A mixed-methods study including surveys and semistructured interviews and focus groups conducted during the 2019-2020 school year.

Participants/setting Surveys (n = 5107) from students in grades 3 and 4 attending 19 pilot and 11 matched control elementary schools and interviews/focus groups among principals, cafeteria managers, teachers, and parents in a representative subsample (n = 6) of pilot schools in Anchorage Alaska.

Main outcome measures Students' self-reported hunger levels and mood and perceptions and supportive strategies from school principals, cafeteria staff, teachers, and parents were examined.

Statistical analyses performed Mixed-model analysis of variance accounting for student demographics with students as a random effect (students nested within schools) were used to examine differences in hunger and mood. For interviews/focus groups, responses were analyzed qualitatively using principles of content analysis.

Results Longer lunch periods were associated with significantly reduced hunger at the end of lunch period and significantly increased self-reported happiness in the cafeteria. Based on interviews/focus groups with school staff and parents, the initiative was generally perceived positively with reported benefits including reductions in disciplinary issues and improvements in student focus, social and emotional learning, and overall student happiness and well-being. Several supportive strategies were identified.

Conclusions Initiatives that increase lunch period lengths and physical activity opportunities have the potential to reduce students' hunger levels and improve focus and behaviors in the classroom. Schools should consider similar initiatives that incorporate the suggested strategies to potentially improve outcomes among students.

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IN THE UNITED STATES, APPROXIMATELY 18.5% OF children ages 2 to 19 have obesity, which can have negative short- and long-term health implications.[1-4] Although research consistently suggests that both healthier dietary patterns and physical activity levels are associated with the prevention and/or treatment of obesity,[2,5-11] few children meet recommendations for both diet and physical activity.[12-14] Schools can be ideal locations to encourage healthier habits as children spend a substantial portion of their time in school and often consume up to half their daily energy intake there.[15,16] Additionally, schools may be particularly interested in promoting healthier eating habits and physical activity as these behaviors are associated with improved academic performance.[17-23]

One factor that can play an important role in the increased consumption of healthy foods at school is having sufficient

time for students to eat.[24] However, there are currently no national standards for lunch period lengths, and as a result, they vary substantially across the United States.[24-26] Additionally, lunch periods include not only seated time when students can consume their meal, but also the time to walk to the cafeteria, wait in line for food, and so on. As a result, students often have only a limited amount of time to eat their lunches, which is associated with greater food waste in the cafeteria.[24]

Schools may also be uniquely positioned to help students achieve recommended levels of physical activity (60 minutes per day of moderate to vigorous activity).[27] Similar to school lunch lengths, there are no national requirements for physical activity in schools. Although almost all states have enacted policies that specify the amount of time schools must provide for physical activity, the strength of these policies vary greatly, and the majority of children do not meet physical activity recommendations.[28,29] Additionally, research suggests that many schools have recently reduced recess time to create additional time for academic subjects.[30]

To potentially improve both the overall health and academic performance of students, Anchorage School District (ASD), in collaboration with a local parent organization, pilot tested a wellness initiative in a subset of elementary schools in the fall of 2019. This initiative included increases to the length of lunch periods, recess, and other physical activity opportunities for students throughout the school day. The aims of this mixed-methods study were to examine the impact of this pilot on students' self-reported hunger levels and mood and to evaluate perceptions and supportive strategies from school principals, cafeteria staff, teachers, and parents.

RESEARCH SNAPSHOT

Research Question: What is the impact of a school-based wellness initiative that increased lunch period lengths, recess, and other physical activity opportunities on students' self-reported hunger levels and mood? Additionally, what are perceptions and supportive strategies from school principals, cafeteria staff, teachers, and parents?

Key Findings: In this school-based evaluation that included 5107 surveys from students in grades 3 and 4 attending 19 pilot and 11 matched control elementary schools, there was a significant inverse association between longer lunch periods and student hunger levels. Based on interviews/focus groups with school staff and parents, the initiative was generally perceived positively and several supportive strategies were identified.

METHODS

Wellness Initiative

ASD's wellness initiative had multiple goals. First, to promote the consumption of healthy school meals by ensuring that students had sufficient time to eat, participating schools were asked to provide students with 10 minutes of *seated* time to eat breakfast and 20 minutes of *seated* time for lunch, with correspondingly longer lunch periods to account for the amount of time needed for students to arrive at the cafeteria and receive a school lunch (based on Centers for Disease Control and Prevention recommendations).[31] This meant that the total lunch period lengths were 25 to 30 minutes in wellness initiative schools vs 20 minutes in nonparticipating schools. Second, schools were asked to provide students with 54 minutes of physical activity (90% of the Centers for Disease Control and Prevention recommendations) every day, including a minimum of 30 minutes of recess (compared with 20 minutes in nonparticipating schools) in addition to classroom movement activities.[32] Schools were given flexibility regarding implementation of the increased movement opportunities for students (eg, adding a second recess or short "brain breaks" that were included in the schedule or taken as needed throughout the day), as long as they continued to meet the academic integrity of the minimum number of minutes allotted to specific academic subjects (eg, English language arts/reading). These movement breaks typically occurred on days when students did not have physical education. In some pilot schools, specialists such as in health or music teachers were asked to include 10 minutes of movement to help students meet the physical activity goals. In schools not participating in the wellness initiative, students received only 20 minutes for recess. Parents were notified of the initiative using various methods (eg, e-mail or letter from the principal). Prior to the start of the 2019-2020 school year, all elementary schools in ASD were contacted and given the option to pilot the wellness initiative. Out of the 63 elementary and charter schools in ASD, 21 initially agreed to participate and 19 implemented the wellness initiative (30%). These elementary schools had students in kindergarten through fifth or sixth grade.

Quantitative Surveys

Surveys were administered to all third and fourth graders in the 19 pilot schools and 11 matched control elementary schools in the fall of 2019 (after approximately 2 months of exposure to the wellness initiative) and in the winter of 2019 (after approximately 5 months of exposure). This paper survey was a minimally modified version of a survey previously used in similar school-based research among the same age group.[33,34] One question from the original survey was removed that was not relevant to the current study. The survey was previously found to be reliable (repeat reliability coefficients ranged from 0.79 to 1.00, $P < 0.05$) and valid.

Teachers were instructed to administer it to students in their classrooms at a time that was close to the end of the school day. Surveys were administered concurrently in the pilot and control schools to account for both seasonal and daily menu variations (menus were the same in pilot and control schools), and grades 3 and 4 were selected based on the validity of the survey for this age group and to minimize the burden on schools and teachers to collect the surveys. Questions included information about grade level (3 or 4) and sex, as well as questions regarding perceived feelings of happiness, calmness, and satiety in the cafeteria and current hunger, energy levels and mood (at the end of the school day). Passive consent methods were used, and no identifying information was collected from the students. A total of 5107 completed surveys were collected (83% response rate among eligible students), and survey responses were double entered by 2 research assistants.

Qualitative Interviews and Focus Groups

Qualitative data that complemented the quantitative research were collected to both acquire a contextualized understanding of the impact of the longer school lunches as well as to obtain a broader understanding of the wellness initiative's implementation, perceived impact, and best practices (ie, "supportive strategies") used by the schools. In the winter of 2019, a representative subsample of pilot elementary schools (n = 6) was selected for a detailed evaluation including interviews and focus groups with key stakeholders (principals, cafeteria staff, teachers, and parents). These schools were selected by ASD to ensure representation of the diverse school district with varying student demographics (based on student race/ethnicity and school size), Title I eligibility (ie, a school where ≥40% of families are low income), and status as a language immersion school.

The research team developed question guides for the interviews and focus groups based on the scientific literature related to longer lunch periods and more physical activity opportunities in school and included input from administrators in ASD and experts in the fields of qualitative, nutrition-based, and school-based research. The guide included open-ended questions and anticipated follow-up questions to encourage discussions regarding different aspects of the pilot wellness initiative. The semistructured interview format enabled spontaneous follow-up questions and probes for clarifications and/or to expand on discussions of relevant topics raised by participants.

Qualitative in-depth, semistructured individual interviews were conducted in person with principals (n = 6) and cafeteria managers (n = 6). Each interview took approximately 30 minutes to complete. For principals, interviews focused on attitudes regarding the wellness initiative (ie, the longer lunch periods and recesses and more physical activity opportunities) and perspectives on the challenges faced and best practices for implementation. For cafeteria managers, interviews focused specifically on the longer lunch periods, including perceived barriers, best practices, and students' behavior in the cafeteria.

Focus groups were also conducted in person with teachers at each school (1 focus group/school; n = 6 focus groups and n = 39 teachers total, with representation from all grades within the participating elementary schools). Focus groups took on average 45 minutes to conduct. All teachers in the participating schools were eligible to be in a focus group. To encourage teacher participation, principals made announcements a few days before and on the day of data collection, and focus groups were held in the faculty lounges at times when more teachers would be available (ie, before school, immediately after school, and/or during lunch breaks). The focus groups were conducted by the evaluation lead using an open-ended question guide (developed using similar methodology to the interview guides) that explored teachers' attitudes toward the wellness initiative, perceived changes in students' behavior, and perspectives on the challenges and best practices for implementation. School administrators were not permitted to attend these sessions to encourage more open feedback from teachers.

Lastly, focus groups were conducted in person with parents at each school (1 focus group/school; n = 6 focus groups and n = 30 parents total). Parents with at least 1 child at a participating school were eligible to be in a focus group. Parents were recruited via e-mails sent out by the principal of each school about an opportunity to discuss wellness in schools more broadly (the subject lines and content of the e-mails not specific to the wellness initiative). Diverse parent representation included both mothers and fathers with children in all grade levels, as well as with children with and without learning disabilities, such as attention deficit hyperactivity disorder. As some parents were unaware of the presence of the wellness initiative (eg, did not recall receiving information about the initiative), the evaluation lead used an open-ended question guide that first discussed parents' general perceptions regarding differences in their children's current behavior both during and after school compared with the year prior. Following these discussions, the evaluation lead explained the wellness initiative (where necessary) and continued using the open-ended question guide to discuss parents' opinions (and perceptions among those already aware of the initiative).

The evaluation lead conducted all the interviews and focus groups in December 2019 at each of the participating schools. Food and drinks were provided for focus groups, but there were no financial incentives for participation in focus groups or interviews. All interviews/focus groups were audio recorded. Recordings were transcribed verbatim by a trained research assistant and checked by the evaluation lead. In the transcripts, participants were given random identification numbers to replace identifying information and protect confidentiality. All participants provided informed consent prior to participation. The institutional review board at Merrimack College approved the study, including both active and passive consent procedures.

Statistical Analyses

To examine differences in students' survey responses between pilot (ie, intervention) and control schools, mixed-model analysis of variance was used, accounting for students nested within schools (SAS PROC MIXED [SAS (computer program). Version 9.4. Cary, NC: SAS Institute Inc]). All models adjusted for the students' grade and sex, school-level Title I status, and time period (fall or winter). A small number of surveys with missing information (n = 27) were excluded from analyses. For qualitative data analyses, content analyses of the transcribed interviews and focus groups were conducted using an immersion/crystallization approach[35] to understand the multiple stakeholders' perspectives of the wellness initiative and to identify patterns and themes in the data. First, 2 research team members read the transcripts in their entirety, taking analytic notes on content and highlighting illustrative quotes. Members of the larger project team discussed emerging themes and patterns, and a codebook was developed based on these discussions. Using this codebook, 2 members of the research team coded a transcript and confirmed consistency of data categorization, and then 1 member of the team coded the remaining transcripts line by line. Code query reports were used to conduct further analysis on specific topics, and the project team collaborated to come to a final interpretation of the data and select illustrative quotes. Insights from these analyses were also included in a report provided to ASD.

RESULTS

Quantitative Surveys

When examining the surveys, student characteristics were evenly distributed by grade and sex at both the pilot and control schools; approximately half the students were in third grade and half were girls. The Table presents the results from the 5107 surveys completed in the fall and winter. Response options were on a 4-point scale, where a 1 reflected a more negative response (eg, "less happy," "very hungry"), and a 4 reflected a more positive response to each question (eg, "more happy," "very full"). On average, examining both data collection time points combined, students in the pilot schools reported that they were significantly happier in the cafeteria compared with students in control schools (mean score of 3.01 vs 2.86; $P = 0.03$). Students in the pilot schools also reported feeling fuller on average both at the end of the lunch periods in general (mean score of 2.65 vs 2.55; $P = 0.01$) and specifically on the day they completed the survey (mean score of 2.71 vs 2.61; $P = 0.004$). There were no differences in students' self-reported feelings of calm in the cafeteria nor in reported feelings of hunger, energy level, or mood at the end of the school day between pilot or control schools. Overall the survey results remained consistent at both time points (fall and winter), except that the average self-reported mood was significantly lower in the winter months compared with the fall in both the pilot and control schools (mean score of 3.04 in the fall vs 2.98 in the winter; $P = 0.02$).

Qualitative Interviews and Focus Groups

A total of 12 interviews (n = 6 principals and n = 6 cafeteria managers) and 12 focus groups (n = 6 focus groups with teachers and n = 6 focus groups with parents) were conducted, after which the study reached saturation and no new information or themes were generated. The qualitative interviews and focus groups centered around 4 specific domains of the wellness initiative: longer lunch periods, longer recess, more movement breaks, and the overall (combined) impact of the wellness initiative. For each domain, major themes and illustrative quotations are summarized in Figure 1. Additionally, based on the interviews and focus groups, supportive strategies associated with more successful implementation for each domain were summarized (Figure 2).

Domain 1: Longer Lunch Periods. ***Sufficient time to eat.*** Parents, teachers, and cafeteria staff consistently characterized the lunch periods from the previous year as "rushed" and "stressful" with insufficient time for students to eat (Figure 1, Theme A1). The majority of interviewed teachers and cafeteria staff believed that the longer lunch periods were especially beneficial for the younger children who typically needed more time to eat. Parents also noticed substantial differences in consumption among children who brought lunch from home, and cafeteria staff noted that there appeared to be less waste overall, but that consumption of school meals was also related to which foods were being served each day. Teachers and cafeteria staff also reported that students were now eating more slowly in the cafeteria. Many parents discussed improvements in children's hunger levels and behavior after school, with several parents characterizing their children the previous year as "hangry" or "starving" after school and observing that this was no longer the case.

Silent lunches. Silent lunches where students were prohibited from talking for at least a portion of the lunch period occurred in several of the participating schools the year before or in past years (often for the first 5 minutes of lunch, referred to as "Nutrition 5" in ASD). Cafeteria managers in participating schools consistently stated that silent lunches were no longer necessary due to the longer lunch periods and this was typically perceived as a positive change (Figure 1, Theme A2).

Benefits to specific populations: lower socio-economic status students and students with special needs. Several teachers, cafeteria staff, and parents noted the longer lunch periods were particularly important for students from lower socio-economic status (SES) families as they typically relied on the school meals but also had less time to eat due to time spent waiting in line to receive a lunch (Figure 1, Theme A3). Cafeteria staff noted that hungrier children, especially those from lower SES households, now had more opportunities to take foods from the "share cart" (a cart where students could place foods from their school lunch that they did not want, which could be taken by other students). Teachers who had students with special needs also emphasized how important the extra time for lunch was for many of their students.

Lunch as an opportunity for social and emotional learning and language development. There was general agreement among parents, teachers, cafeteria staff, and principals that the cafeteria was a valuable time for students to have social interactions and opportunities for social and emotional learning (Figure 1, Theme A4). Lunch was also seen among some teachers as an opportunity for language development among students who were English language learners (ie, English as a second language).

Disruptive behaviors in the cafeteria. Some teachers noted disruptive behaviors during the last 5 to 10 minutes of certain lunch periods (primarily among sixth graders) and felt that 30 minutes was too long for older children (Figure 1, Theme A5). However, in schools that provided activities in the cafeteria for children who consumed lunch faster, teachers reported less disruptive behaviors (Figure 2, Theme A1). Other teachers stated the importance of creating strong expectations at the beginning of the school year regarding cafeteria behavior to reduce disruptions and/or having a person with perceived authority (eg, principals or teachers) overseeing lunch.

Teachers and cafeteria staff frequently reported that students who had recess before lunch were less disruptive in the cafeteria. This was observed in schools where the timing of recess had changed from the year prior and/or within schools where grades varied in whether they had recess before or after lunch. One teacher discussed how recess before lunch also helped to push back the start time of lunch for the earliest lunch/recess blocks (ie, lunch would otherwise have been too early). Teachers also highlighted the ability during lunch to resolve issues that arose on the playground so that they did not impact class time.

Impact on teachers. In most schools, teachers had to take on additional responsibilities to implement the longer lunch periods. This varied from assisting with transitions at lunch

Domains and themes	Illustrative quotes
A. Longer lunch periods	
A1. Longer lunch periods may lead to more relaxed cafeteria environment and greater food consumption at lunch.	"My three kids come home with empty lunchboxes. That's never been the case." *(Parent)* "We have less food coming home. There is a lot less food waste. My son is not crying at 3 pm. He has fewer stomach aches." *(Parent)* "I love it. It helps with nutrition. There is less waste. Lunch is calmer. There isn't the rush to eat." *(Cafeteria manager)* "Last year they had to rush . . . Now they can eat everything and relax for a bit. Especially the little ones. Thirty minutes is just right." *(Cafeteria manager)*
A2. Silent lunches may no longer be necessary with longer lunch periods.	"[In the past] They said no talking during eating. Now the stress is lifted. No more silent lunches. [Now] It's only if they are in trouble." *(Cafeteria manager)*
A3. Specific populations (eg, students of lower socio-economic status) may benefit from longer lunch periods.	"With the share cart, now there usually isn't anything left. The kids who need it [food insecure children] are getting it." *(Cafeteria manager)*
A4. Longer lunch periods may provide more opportunities for social and emotional learning and language development.	"I love it. Kids need time to eat, socialize, and bond with peers." *(Principal)* "They get to talk to their friends. If they finish early, they have time for friendship." *(Cafeteria manager)*
A5. Longer lunch periods may lead to more disruptive behaviors in some school cafeterias, but the behaviors can be reduced/eliminated with supportive strategies.	"The lunchroom just gets crazy. It's very loud in the end. The kids are playing around. I would love to see recess first." *(Teacher)* "In the past it's been chaos. Now we set expectations. Kids know they don't get up. We don't let kids take trash around. In the past there was yelling, humiliation. Now they sit there calm." *(Teacher)* "The principal was in there [the cafeteria] sporadically and that would help. An authority figure makes a difference on behavior." *(Cafeteria manager)* "They were worse last year. They had so much built-up energy. Now they sit down and eat their food! But it's just for the kids who have recess first." *(Cafeteria manager)* "We switched recess before lunch and it made a huge difference in behaviors. Not as much drama. They sit, they eat, they socialize." *(Teacher)*
A6. The impact of longer lunches on teachers varies based on their role with implementation.	"We really get to know them as people. We enjoy it." *(Teacher)* "We get to meet the kids and establish a rapport with kids in younger grades." *(Teacher)* "I didn't have teachers responsible for putting it in place. It would have had a negative connotation for more work." *(Principal)*

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Figure 1. Domains and themes identified through interviews with principals and cafeteria staff, and focus groups with teachers and parents about a pilot wellness initiative in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and focus groups were conducted with teachers (n= 6 focus groups; n = 39 teachers total) and parents (n = 6 focus groups; n = 30 parents total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day

Domains and themes	Illustrative quotes
	"We are mandated to have duty in the lunchroom so professional work time is impacted. It's impacting our collaborative time." *(Teacher)* "There isn't coverage for the kids so teachers are feeling more burnt out . . . teachers are doing less for other things [like one-on-one or small-group activities] because they are doing so much more." *(Teacher)*
B. Longer recess	
B1. Thirty minutes of recess may be an appropriate amount of time for most students.	"The stress level of the staff is reduced. We know they have an opportunity to play if they have a behavior issue. Before you were like 'Go! Go! Go! Go! Go!' Now I can say, 'Don't worry, you still have time to play.' The kids feed off our stress." *(Teacher)*
B2. Indoor recess with more sedentary activities can potentially have negative impacts on students.	"Behavior problems are through the roof when they don't have the ability to get outside and run." *(Teacher)*
B3. Longer recess can be difficult to implement in some schools due to staffing issues.	"We are usually short on noon supervisors so areas are closed at recess and sometimes there is no equipment." *(Teacher)* "It's hard to staff. You need someone who is kind, caring, and responsible, who passed a background check, who are willing to segment their day to work 2 hours, and then be paid $10 an hour." *(Teacher)*
C. Other additional movement opportunities	
C1. Many teachers positively view having flexibility to implement movement breaks.	"A year ago it was not OK to take your students outside. Now there is leeway. Now if you're outside it's OK. That's one thing that I think is wonderful. Now it's acceptable." *(Teacher)*
C2. Additional movement opportunities can potentially have a positive impact on students.	"In the morning we do a dance break with music. In the afternoon we do cosmic yoga to relax. They are so happy." *(Teacher)* "After the break, the kids are more eager to learn." *(Teacher)*
D. Combined impact of wellness initiative	
D1. The wellness initiative may improve students' ability to focus and behaviors in the classroom.	"I didn't want to do it originally, but they seem more awake, more focused." *(Teacher)* "There is more quality work over a shorter amount of time." *(Teacher)* "He needs movement to focus. Having that ability, we've seen such growth from him . . . There is a night and day difference for [both] my boys who can't sit still." *(Parent)* "Behavioral referrals are way down. I anticipated extra and it's almost nonexistent after the lunch/recess break. It's the week before break and I currently have zero referrals. That's unusual." *(Principal)*

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Figure 1. *(continued)* Domains and themes identified through interviews with principals and cafeteria staff, and focus groups with teachers and parents about a pilot wellness initiative in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and focus groups were conducted with teachers (n= 6 focus groups; n = 39 teachers total) and parents (n = 6 focus groups; n = 30 parents total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day

Domains and themes	Illustrative quotes
D2. Teachers' perceptions of the wellness initiative's impact on academics varies with perceived flexibility with implementation.	In schools where teachers perceived flexibility with implementation: "The benefits outweigh the academic time." *(Teacher)* "We do math relays. They have 3 teams and they do a bear crawl across the room. At first they think they're too cool, but then they have fun." *(Teacher)* "We do ABCD choices. If you think the answer is A, do 15 jumping jacks, B do 10 pushups, C run in place, D planks or sit-ups." *(Teacher)* In schools where teachers perceived less flexibility with implementation: "It's hard to get science and social studies in." *(Teacher)* "The challenge is the required blocks for the other subjects. The extra 15 min isn't a big deal but it feels crammed." *(Teacher)*
D3. The wellness initiative may improve child happiness, well-being, and social and emotional learning.	"They are happier. They can be moody, especially this time of year [winter], and we haven't seen as many issues." *(Teacher)* "There are less tears. There is less frustration." *(Teacher)* "They want to come to school now. They love it." *(Parent)* "At [age] 8, my kid is finally sleeping through the night. He's not as stressed." *(Parent)*
D4. Principal/teacher buy-in are necessary for successful implementation of the wellness initiative.	"The teachers have to own it. I could have told them how it had to be, but I wouldn't have had staff buy-in . . . They bring me ideas. I'm OK with it if they tell me how they'll make it work." *(Principal)* "I was against the lunch and recess pilot. I told them [the teachers] I'm not in favor. I left it in their hands. They went around and got buy-in from other teachers and they said yes. Now I think it's great." *(Principal)*

Figure 1. *(continued)* Domains and themes identified through interviews with principals and cafeteria staff, and focus groups with teachers and parents about a pilot wellness initiative in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and focus groups were conducted with teachers (n= 6 focus groups; n = 39 teachers total) and parents (n = 6 focus groups; n = 30 parents total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day

for 5 to 10 minutes to overseeing the entire lunch period. At some schools, teachers took turns overseeing the lunch periods. Teachers who only had some additional responsibilities (eg, helping with transitions for 5 to 10 minutes or swapping days with other teachers to oversee the lunch periods) typically felt positively about implementing longer lunch periods (Figure 2, Theme A2). These teachers frequently mentioned the benefits of the positive interactions with students at lunch, which enabled them to get to know their students and/or students in other grade levels better (Figure 1, Theme A6). This was also perceived as potentially leading to easier transitions the following year for younger children.

However, teachers who were now regularly required to cover the entire lunch period typically had negative responses. These teachers frequently described the added responsibilities as exhausting and perceived that this led to less time for teacher development/collaboration. Additionally, teachers in these schools reported that they were less likely to volunteer for other activities for students during or after school compared with in the past.

Domain 2: Longer Recess. *Length of recess.* The majority of parents and many teachers felt that 30 minutes was an appropriate amount of time for students to have recess (Figure 1, Theme B1). Noted benefits included more time for social and emotional learning, creative play, and opportunities to develop friendships. Several parents and teachers also mentioned that lower SES students frequently did not have opportunities after school to play outside, so recess was particularly important.

However, there were concerns presented by some teachers that 30 minutes was too long. In some schools, sixth-grade students in particular spent recess not engaged in physical activity (eg, primarily "hanging around"). One teacher said

Domains and themes	Supportive strategies
A. Longer lunch periods	
A1. Teachers and staff can reduce disruptive behaviors in the cafeteria.	1. Recess before lunch was perceived to reduce disruptive behaviors during lunch (after exercising, many teachers and cafeteria staff noticed a greater ability for students to sit still and calmly eat lunch in the cafeteria). 2. Engaging activities in the cafeteria, including board games (eg, Chutes and Ladders), card games (eg, Uno), SEL[a] games, and Rubik's Cubes, were perceived to reduce disruptive behaviors. Teachers noted the need for age-appropriate games for differing grade levels (eg, paper and crayons for kindergarten and first grade). 3. Setting strong expectations in the cafeteria was also perceived to reduce disruptive behaviors. Initially, there was greater teacher involvement in the cafeteria (eg, for the first 2 weeks of school) with a plan developed and implemented consistently, then transitioning teachers to a reduced role with only one person in the cafeteria to maintain control. 4. Screen time in the cafeteria should be avoided as a method to reduce disruptions to ensure time for SEL and language development.
A2. Schools can implement a balanced approach to teacher involvement in the cafeteria.	1. Five to 10 min to assist with transition in the cafeteria was perceived as beneficial by teachers, but assistance beyond that was reported to impact teachers' professional development time and necessary breaks. 2. Collaborative teacher schedules can be an alternative when teachers must oversee entire lunch periods. This worked best when 2 grades shared a lunch period so that teachers within the same grade could collaborate on days when they did not have cafeteria duty.
B. Longer recess	
B1. Schools can create positive experiences and sufficient movement opportunities with longer recesses.	1. More engaging equipment and/or structured optional opportunities at recess (eg, basketballs, soccer balls, sleds [cold weather climates]) were perceived to improve physical activity during recess, especially for older kids. Teachers recommended that structured opportunities should be optional to ensure students have SEL and creative opportunities. 2. More active indoor recess opportunities for days when students could not go outdoors was perceived as helpful. Teachers noted that the ability to use other spaces (eg, the gym, multipurpose rooms) for engaging, age-appropriate activities that involved movement inside the classroom was helpful for students.

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Figure 2. Supportive strategies to successfully implement a wellness initiative identified through interviews with principals and cafeteria managers and focus groups with teachers in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and 6 focus groups were conducted with teachers (n = 39 teachers total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day.

Domains and themes	Supportive strategies
	3. Two outdoor recesses included in the schedule block was perceived as helpful for students. Teachers recommended each recess be a minimum of 20 min to enable students to have sufficient time to have exercise (and put on appropriate clothes/snow gear when applicable). Where necessary, teachers recommended a designated, multigrade second recess so that teachers could take turns with recess duties. 4. Providing extra outdoor clothing for students to borrow when necessary (eg, donated coats, boots, snow pants) was perceived as helpful for both lower-income students and those who had left appropriate clothing at home.
B2. Schools can potentially address insufficient staffing at recess.	1. Increased wages for part-time staff and/or help from teaching assistants was recommended to ensure there was sufficient staffing at recess. 2. Flexibility for staff to do part of a shift inside the cafeteria and part of the shift outside on the playground (ie, not full shifts outside, particularly on days with cold [or hot] outdoor temperatures) was recommended.
C. Other additional movement opportunities	
C1. School policies can help to support implementation of additional movement opportunities.	1. Flexibility with implementation was suggested to enable teachers to implement more movement breaks on more challenging days when students needed more breaks (or fewer breaks when the breaks weren't needed). Some teachers recommended more active brain breaks in the morning (eg, Go Noodle songs/activities) and more relaxing ones (eg, yoga and mindfulness) in the afternoon. 2. Allowing teachers to have outdoor movement breaks was consistently perceived to improve students' behavior and focus. This varied from a quick jog outside to a second recess included in the schedule. 3. Additional support from specialists was recommended (where appropriate [ie, dancing in music class]) to help ensure that students had sufficient movement opportunities, especially on days when students did not have physical education.

(continued on next page)

Figure 2. *(continued)* Supportive strategies to successfully implement a wellness initiative identified through interviews with principals and cafeteria managers and focus groups with teachers in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and 6 focus groups were conducted with teachers (n = 39 teachers total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day.

that there were frequently disputes on the playground that then needed to be resolved during class time and the teacher felt this would occur less often with shorter recess (or with more structured opportunities at recess). Some teachers also had concerns about students becoming cold with 30-minute recess due to inactivity (primarily sixth graders) and insufficient outdoor attire for the winter (both among lower SES students and sixth graders). Suggestions proposed by teachers included more engaging equipment, optional structured opportunities, and/or 2 recesses that were 20 minutes each (Figure 2, Theme B1).

Indoor recess. When compared with outdoor recess, teachers and parents highlighted substantial increases in behavioral issues during and after school on days when students had indoor recess (Figure 1, Theme B2). Indoor recess typically did not

Domains and themes	Supportive strategies
D. Combined impact of wellness initiative	
D1. The wellness initiative has the potential to be successfully expanded to other schools.	1. Creation of an implementation guide for schools, such as an "implementation toolbox" with supportive strategies, can help principals, teachers, and staff determine what will likely work the best in their schools and in their classrooms. Training for teachers and staff was also recommended as strategies that improved implementation. 2. Recognition that individual schools, grade levels, and classrooms may differ will enable schools (ie, principal, teachers, and staff) to develop implementation plans that will increase the likelihood of success within and between schools in a district. 3. Problem solving in advance and in a flexible manner to discuss potential issues and solutions was perceived to lead to creative solutions and more buy-in from teachers and staff. Teachers perceived more positive outcomes when given more autonomy and opportunities to develop collaborative strategies (eg, swapping lunch duties, specialists including movement in their classes). 4. Buy-in and messaging/communication is important for principals, teachers, staff, and parents to ensure a positive perception, and successful implementation, of the program. When there was buy-in from the principal, this was perceived to transfer to buy-in from the teachers and parents. 5. Balanced approach to the role of teachers and staff. When teachers perceived a balance regarding added responsibilities, the overall wellness initiative was more successful. Taking on too many added responsibilities led to negative responses from teachers, which appeared to potentially impact students.
[a]SEL = social and emotional learning.	

Figure 2. *(continued)* Supportive strategies to successfully implement a wellness initiative identified through interviews with principals and cafeteria managers and focus groups with teachers in elementary schools in Anchorage, Alaska. Interviews were conducted among 6 principals and 6 cafeteria managers, and 6 focus groups were conducted with teachers (n = 39 teachers total). Pilot wellness initiative schools increased their school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and provided 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day.

involve physical activity and instead included more sedentary activities such as arts and crafts. Teachers perceived that using multipurpose spaces or the gym for more active opportunities could help address this issue (Figure 2, Theme B1).

Staffing issues. The need for more assistants to help with implementation of longer recess was a consistent theme at schools (Figure 1, Theme B3). Staffing issues were perceived to be a problem due to both lower wages for aides and that the work required aides to spend several hours outside in the cold weather. Consequently, principals and teachers felt that higher wages and/or flexibility for the staff to switch between working outside at recess and in the cafeteria could help address these issues (Figure 2, Theme B2).

Domain 3: Other Additional Movement Opportunities.

Ability to have movement breaks. Many teachers discussed how in the past they felt that they were not allowed to have movement breaks or described how they had gotten in trouble for these activities (Figure 1, Theme C1). These teachers appreciated the ability to implement movement breaks in their classrooms.

Impact on students. The majority of teachers said that "brain breaks" had a positive impact on students' behaviors and their ability to focus (Figure 1, Theme C2). Many teachers felt that having a second recess scheduled in the morning was beneficial to students. Some teachers also enjoyed having the flexibility to implement breaks as needed (Figure 2, Theme

Table. Results from n = 5,107 surveys examining student mood, satiety, and energy levels in pilot wellness initiative school or control elementary schools in Anchorage, Alaska[a]

Survey Questions	Control (n = 2347)	Intervention (n = 2760)	*P* value[b]
	←——mean (SE)——→		
How often do you feel calm in the cafeteria? (1 = never; 2 = sometimes; 3 = often; 4 = very often)	2.71 (0.05)	2.74 (0.04)	0.6
How often do you feel happy in the cafeteria? (1 = never; 2 = sometimes; 3 = often; 4 = very often)	**2.86 (0.05)**	**3.01 (0.04)**	**0.02**
How do you usually feel when you finish lunch at school? (1 = very hungry; 2 = a little hungry; 3 = a little full; 4 = very full)	**2.55 (0.03)**	**2.65 (0.03)**	**0.01**
How hungry do you feel right now (end of school day)? (1 = very hungry; 2 = a little hungry; 3 = a little full; 4 = very full)	2.19 (0.05)	2.20 (0.04)	0.8
How hungry did you feel right after lunch today? (1 = very hungry; 2 = a little hungry; 3 = a little full; 4 = very full)	**2.61 (0.03)**	**2.71 (0.02)**	**0.004**
What is your energy level right now (at the end of the school day)? (1 = low; 2 = medium low; 3 = medium high; 4 = high)	2.82 (0.03)	2.82 (0.02)	0.97
What is your mood right now (at the end of the school day)? (1 = less happy; 4 = more happy)[c]	3.00 (0.03)	3.01 (0.02)	0.5

Note: Boldface indicates statistical significance ($p<0.05$).

[a]Surveys were conducted among third- and fourth-grade students in control schools and pilot wellness initiative (ie, intervention) schools that included increasing school lunch period lengths to enable a minimum of 20 minutes of *seated* time (ie, 25- to 30-minute lunch periods) and 54 minutes of movement opportunities each day, including 30 minutes of recess and other movement opportunities during the school day. Surveys were administered at 2 time points (fall and winter) with the average scores presented for control and intervention schools.

[b]Analyses were conducted using multilevel modeling (accounting for clustering within schools), adjusting for student sex, age, survey administration time (time 1 [fall] or time 2 [winter]), and Title I school status.

[c]Mood was depicted using emoticon faces that ranged from a frown (score of 1) to a large smile (score of 4).

C1). Teachers frequently mentioned that opportunities to go outside were especially beneficial even if just for a brief period of time (eg, having children do a quick jog around the school yard without having to put on snow gear). Some teachers recommended that the timing of breaks be flexible and/or not told to students who might otherwise stop paying attention in class to look at the clock waiting for a break to begin.

Domain 4: Combined Impact of Wellness Initiative. ***Ability to focus and behaviors in the classroom.*** The majority of teachers and parents reported a positive impact on the ability of students to focus in class and on students' behaviors (Figure 1, Theme D1). Many teachers perceived that there was more efficient learning. Improvements were especially observed in boys and children with attention deficit disorder/attention deficit hyperactivity disorder. As noted previously, these benefits were primarily seen in schools where teachers did not have to take on substantially more work for implementation. In schools where teachers had greater responsibilities, teachers and principals reported more students sent to the principal's office after the lunch/recess compared with years prior.

Impact on academic curriculum. In schools where teachers perceived more flexibility with implementation, the wellness initiative appeared more successful in regard to balancing instructional time and the initiative (Figure 1, Theme D2). Several teachers added movement when teaching core subjects (eg, math relays) to make implementation more manageable.

However, in schools where there was the perception of inflexibility with the time allotted to certain core subjects (eg, English language arts) both teachers and parents expressed concern that there was a decrease in instructional time being spent on other subjects such as social studies, science, and social and emotional learning. In schools where transition times were not included in the schedule, teachers also often felt overwhelmed with the addition of the wellness initiative. Several principals, teachers, and parents felt that students would benefit from a longer school day to ensure they were getting both the initiative and academics.

Child happiness, well-being, and social and emotional learning. Several parents and teachers discussed improvements in children's mood, stress levels, and/or positive views of school with the wellness initiative (Figure 1, Theme D3). Many parents stated that their children were sleeping better at night. Teachers and parents also consistently brought up the importance of social and emotional learning and how the wellness initiative helped to support this. They perceived that the greater amounts of unstructured time, especially at lunch and recess, provided more social and emotional learning opportunities.

Flexibility and principal/teacher buy-in. Teachers and principals both discussed that when teachers had more

flexibility and control over how the wellness initiative was implemented, there was better buy-in from teachers and the pilot program was more successful (Figure 1, Theme D4). Buy-in from the principal also appeared essential for the program's success. Communication (eg, how changes were communicated to both the principals and teachers) was highlighted as a key factor for acceptance of the initiative. Additional suggestions to improve buy-in included the creation of an implementation guide for schools that accounted for differing needs and student populations within a school, as well as collaborative, flexible problem solving in advance (Figure 2, Theme D1).

DISCUSSION

This study found that a wellness initiative to increase lunch lengths, recess, and movement opportunities was generally perceived positively by principals, teachers, cafeteria managers, and parents. Reported benefits included reductions in disciplinary issues and improvements in student focus, social and emotional learning, and overall student happiness and well-being. These positive experiences were more frequently reported when there was buy-in from principals, teachers, and staff, as well as greater flexibility in implementation, and when teachers were only required to invest a limited amount of additional time to monitor the implementation of longer lunch periods. However, results were mixed in schools without principal and/or teacher buy-in. The longer lunch periods appeared to benefit children, especially those who were younger, had special needs, and/or were from lower-income families. Students reported greater levels of satiety, which corresponded to the perceptions of cafeteria managers, teachers, and parents that students consumed more at lunch with the longer lunch periods. Additionally, longer lunches were perceived to have additional benefits such as the removal of silent lunches and increased opportunities for social and emotional learning, which may in part explain the higher levels of students' self-reported happiness in the cafeteria.

Previous research has documented increases in healthy food consumption among elementary school students in schools with longer lunch periods.[24] The present study expands on these findings with students' self-reported increased satiety levels. This study also highlights additional potential benefits of longer lunch periods including a calmer cafeteria environment, more opportunities for social/emotional learning, and potentially increased student happiness in the cafeteria. This study also suggests that longer lunch periods may provide a better alternative to silent lunches.

Interestingly, although many schools in the United States have reduced movement opportunities for more academic time, many teachers in the present study perceived that the initiative led to more efficient learning.[32] This is consistent with previous research, which has found that physical activity is associated with improved focus and academic outcomes.[36,37] This may be particularly important for influencing school policies as this aligns with school priorities and can potentially help reduce tensions between balancing health initiatives that may be seen as competing with academic time.[38] Future research should examine the impact of similar initiatives on direct measurements of student behaviors, disciplinary issues, and learning outcomes in schools.[20-23] This study also highlighted the potential negative implications of sedentary indoor recess due to inclement weather, and future research should evaluate the impact on students. Several parents also perceived that the wellness initiative improved their children's sleep, and future research should examine the impact of similar initiatives on sleep quality and duration.

This study had several limitations. First, data were collected in only 1 school district in Alaska. However, ASD is one of the most socioeconomically, racially, and geographically diverse districts in the nation, and the supportive strategies identified will likely still be applicable to other school districts.[39,40] Additionally, schools were not randomized to the wellness initiative, and therefore selection bias may have been an issue. However, principal buy-in varied at the onset of the wellness initiative, suggesting that these schools may be representative of the district more broadly. Although all principals and cafeteria managers in the participating schools were included in interviews, not all teachers and parents were included in focus groups, and therefore there may be differences between those who agree to participate in a focus group compared with those who do not. However, diverse teachers and parents were included (representing all grade levels), and recruitment did not explicitly state this was regarding the wellness initiative, which may have improved the generalizability of the findings. Having sixth graders in several of the elementary schools also presented unique challenges for the wellness initiative, and therefore implementation may be easier in K-5 elementary schools, or there may need to be additional supports or structure offered for older elementary school students to be active and engaged during recess periods. Lastly, financial analyses were not included as part of this pilot study, and future studies should determine the cost and sustainability of similar initiatives.

CONCLUSIONS

This study found that a wellness initiative that increased the amount of time students had to eat lunch, as well as increased opportunities for students to be physically active, has the potential to reduce student hunger levels and improve student focus and behavior in the classroom. The initiative was generally considered more successful in schools where there was greater buy-in from principals, teachers, and staff. Schools should consider similar initiatives that incorporate the suggested strategies to potentially improve outcomes among students.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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J. F. W. Cohen, M. Stock, M. Scott, M. Sutton, A. E. Potempa, K. Fink conceived the study. J. F. W. Cohen, K. Cueva, R. E. Goldman, D. N. Margolis developed the study design. J. F. W. Cohen and M. Scott collected the data. J. F. W. Cohen, E. T. Shonkoff, R. E. Goldman, and S. Gustus conducted the analyses and assisted with the interpretation of the data. J. F. W. Cohen led the writing. M. Scott, M. Sutton, K. Cueva, E. T. Shonkoff, R. E. Goldman, D. N. Margolis, A. E. Potempa, K. Fink, S. Gustus, and M. Stock provided critical feedback on the manuscript.