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Parent perceptions of school meals and how perceptions differ by race and ethnicity

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Abstract

Parental perceptions of school meals can affect student participation and overall support for school meal policies. Little is known about parental school meal perceptions under universal free school meals (UFSM) policies. We assessed California parents' perceptions of school meals during the COVID-19 emergency response with federally funded UFSM and whether perceptions differed by race/ethnicity. Among 1110 California parents of K–12 students, most reported school meals benefit their families, saving them money (81.6%), time (79.2%), and stress (75.0%). Few reported that their child would be embarrassed to eat school meals (11.7%), but more parents of White students than Hispanic students reported this. Many parents reported that their child likes to eat lunch to be with friends (64.7%); about half felt their child has enough time to eat (54.2%). Fewer parents perceived school lunches to be of good quality (36.9%), tasty (39.6%), or healthy (44.0%). Parents of Hispanic and Asian students had less favorable perceptions of school meal quality, taste, and healthfulness than parents of White students. Parents report that school meals benefit their families, but policy efforts are needed to ensure schools have the resources needed to address cultural appropriateness. Schools should address parental perceptions of meals to optimize participation, nutrition security, and health.

Key words: NSLP; SBP; school meals; UFSM; parental perceptions.

Introduction

The National School Lunch Program (NSLP) and the School Breakfast Program (SBP) serve meals to students in public and charter schools that meet federal nutrition standards.^{1,2} The NSLP provided over 4.9 billion lunches, and the SBP provided over 2.5 billion breakfasts to school-age students in the United States during the 2019–2020 school year.^{1,2} Historically, schools that participate in the NSLP and SBP offer school meals either for free or at a reduced price (collectively known as “Free or Reduced-Price Meals” [FRPM]), or by paying the full price (which is also modestly subsidized), depending on the student’s or school community’s household income.¹ To mitigate the potential harms of school closures on students’ food security during the COVID-19 pandemic, US Congress authorized the US Department of Agriculture (USDA) to issue nationwide waivers that allowed all schools to provide universal free school meals (UFSM) starting in May 2020 until the end of school year (SY) 2021–2022.^{3–5}

California and Maine, followed by other states including Vermont, Nevada, Colorado, and Massachusetts, have since enacted policies to continue to offer UFSM.⁶

Since the implementation of the Healthy, Hunger-Free Kids Act (HHFKA) of 2010, the nutritional quality of school meals has improved, and recent studies have found that school meals, on average, are the healthiest source of foods consumed by children in the United States.^{7–11} Although the new standards improved the overall nutritional quality of school meals, multiple factors affect the types of foods that schools can offer. Not all schools have a kitchen on site where they can prepare school meals and some depend on other schools, vendors, or centralized kitchens to provide them with fully or partially prepared school meals.¹² The majority of School Food Authorities in California and across the United States report inadequate facilities, kitchen equipment, staff, and funding, which makes it difficult to operate school nutrition programs and to offer healthier/high-quality school meals.^{13–15}

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Although most students eat school meals, many others do not, even when they attend schools that offer UFSM or even if they are eligible to receive free meal benefits (the average participation rate among students with access to free school meals was 75% for lunch and 41% for breakfast).^{12,16,17} Multiple factors have been found to affect student participation in school meal programs, including parent perceptions and beliefs about school meals.¹⁸⁻²⁰ Positive parental perceptions are associated with higher student participation.^{20,21} Additionally, parent perceptions of school meals can impact the success of UFSM policies.^{22,23}

School meals offer an opportunity to improve food security for students from families struggling economically, and studies have found that students with socioeconomic disadvantages are more likely to eat school meals, resulting in a higher likelihood of school meal participation among Black and Hispanic students in the United States.^{19,20,24-28} Moreover, with the growth of the multiracial population in the United States²⁹ and the adoption of UFSM policies, it is important for school meals to meet students' cultural preferences to make school meal programs more inclusive, to increase student participation, and to improve nutrition security for all students. While several studies have shown that immigrant parents report that school meals do not include enough culturally appropriate foods,^{30,31} little is known about how parent perceptions of school meals differ by race and ethnicity. One study that examined the relationship between race and ethnicity and parent perceptions of school meals found that parents of Black children were significantly more likely to positively assess the healthfulness of the school food environment compared with parents of White children.³² More research is necessary to explore this topic among other populations. Furthermore, there are disparities by race and ethnicity in diet and health outcomes in the United States,³³ so understanding families' perceptions of and experiences with school meals and how they differ by race and ethnicity can help focus efforts to equitably improve school meal participation and nutrition security.

To address the information gap related to whether parental perceptions of school meals under UFSM policies differ by parents' racial or ethnic background, this study aimed to assess California parents' perceptions of school meals and to examine whether these perceptions differed by race and ethnicity. The data were collected during the SY 2021–2022 when federal waivers made school meals available free of charge to all students.

Data and methods

Study design and participants

This cross-sectional study included California parents and guardians (hereafter referred to as “parents”) having 1 or more children in grades kindergarten through 12 (K–12) who attend a public or charter elementary, middle, or high school in California. Sampling quotas were designed to reflect the characteristics of California school students with regard to race and ethnicity, region, and FRPM eligibility, aiming for a total sample size of 1000 with 55% parents of Hispanic students, 22% parents of White/Caucasian students, 12% parents of Asian/Asian-American students, 5% parents of Black/African-American students, and 6% parents of students of other races,³⁴ and 40% parents of students eligible for free meals, 20% eligible for reduced-price meals, and 40% not eligible for FRPM.³⁵

The Institutional Review Board of the University of California, Davis (protocol code IRB-FY21-22-19, approved January 14, 2022), approved the study protocol. Written informed consent was obtained online from all parents by asking them to agree to participate prior to answering any survey questions.

Recruitment

In May 2022, an independent research firm sent an invitation to parents participating in their research panel ($n = 152\,000$) via email, text (SMS), and multimedia (MMS) messages³⁶ asking them to complete an online survey about school meals during the SY 2021–2022. The invitation was not connected with any specific schools. The survey link remained open until the survey quotas, described above, were reached, which took 3 weeks. Parents who clicked on the survey link but did not meet the eligibility criteria or who fit a closed quota category ($n = 2012$) were thanked and the survey was not completed. The final sample included 1100 participants.

Survey instrument

The survey, which utilized validated items when possible,³⁷⁻³⁹ was developed by the research team; reviewed and revised by external experts in research, policy, and community-based programs; and then pilot-tested by a set of parents of K–12 students from diverse races, ethnicities, and socioeconomic backgrounds. The final survey included 10 screener questions to determine eligibility and gather demographic information (eg, state, county, ethnicity, race, type of school, household size, and household income), asked for consent to participate in the survey, and then included 34 questions assessing different aspects of the school meal programs (see [Appendix A](#)).

The survey was designed to be self-administered (either in English or in Spanish), programmed in Qualtrics (Qualtrics, Provo, UT), and could be accessed online using a phone, computer, or tablet (Qualtrics Version March 2022; Provo, UT). It took participants approximately 20 minutes to complete the survey. Parents with more than 1 child in grades K–12 were asked to focus their responses on their child with the most recent birthday. Parents received a \$20 thank-you gift card for completing the survey.

Measures

Parent perceptions

We assessed parents' perceptions of, and experiences with, school meals generally, as well as perceptions specific to school lunch. Questions regarding general perceptions of school meals included whether parents agreed that school meals can save their family money, save their family time, reduce stress, benefit students academically, whether meals are only for children whose families have low incomes, and whether their child would be embarrassed to eat school meals. These items utilized 5-point Likert scale response options: “strongly disagree,” “disagree,” “neither agree nor disagree,” “agree,” “strongly agree,” and “don't know.”

Race and ethnicity

Parents were asked to report the race and ethnicity of their child by answering the question “What is your child's race? (mark all that apply)” with response options “Alaska Native/American Indian,” “Asian/Asian American,” “Black/African

American,” “Native Hawaiian/Other Pacific Islander,” “White/Caucasian,” and “Other (please specify)” and “What is your child’s ethnicity?” with response options “Hispanic/Latino” and “Not Hispanic/Latino.” Race and ethnicity were combined into 5 categories for analysis: (1) White (non-Hispanic), (2) Hispanic (including White and all other races), (3) Black (non-Hispanic), (4) Asian (non-Hispanic), and (5) other race/multiracial (due to small sample sizes, this category included Alaska Native/American Indian, Native Hawaiian/Other Pacific Islander, other race, and more than 1 race category).

Covariates

Covariates in the analyses included school level (elementary, middle, high), urbanicity (urban, non-urban), FRPM eligibility (free, reduced-price, noneligible), total number of children under 18 years living with the parent (count), and typical weekly frequency of lunch consumption in the current SY (count). The urbanicity classification used the reported zip code and was based on the 2010 USDA rural-urban commuting area (RUCA) codes that classify US Census tracts or zip code areas using measures of population density, urbanization, and daily commuting.^{40,41} Urbanicity was dichotomized into urban (RUCA primary code = 1) and non-urban (RUCA primary codes = 2–10). The FRPM eligibility for school meals was based on self-reported household size and income; each family was classified as eligible for free meals (family income <130% of the federal poverty line [FPL]), eligible for reduced-price meals (family income 130%–184% of FPL), and noneligible (family income >185% of FPL).⁴² Covariates were chosen based on prior literature demonstrating their relation to school meal operations, student participation, and/or perceptions of school meals.^{19,20,43}

Statistical analysis

Means and standard deviations of descriptive statistics were used to describe continuous and count variables. Frequencies and percentages were used to describe categorical variables. Logistic regression models were used to compare parent perceptions by race and ethnicity, adjusting for school level, urbanicity, FRPM eligibility, the total number of children under 18 years living with the parent, and frequency of lunch consumption. Adjusted percentages and *P* values were reported. The frequency of school lunch participation by race and ethnicity was adjusted for school level, urbanicity, FRPM eligibility, and the total number of children under 18 years using linear regression models. Adjusted means and standard errors were reported. A Bonferroni correction was used to account for multiple pairwise comparisons between different race and ethnicity categories (Bonferroni $\alpha = .01$). All statistical analyses were conducted in Stata (Stata Statistical Software: Release 17. 2021; StataCorp LLC, College Station, TX).

Results

Most respondents identified as the mother of the student (85.9%), used English as their preferred language (80.5%), had students in elementary schools (58.6%), and identified their child as Hispanic (51.7%), and almost half reported their child being eligible for free meals (43.6%) (Table 1).

Table 1. Characteristics of survey respondents and their children (*n* = 1110).

	<i>n</i>	%
Survey respondent characteristics		
Relationship with student		
Mother	954	85.9
Father	112	10.1
Other ^a	44	4.0
Preferred language		
English	893	80.5
Spanish	217	19.5
Household size		
2–3 people	311	28.0
4 people	373	33.6
5 or more people	426	38.4
Urbanicity		
Urban	940	89.5
Non-urban	110	10.5
Characteristics of the student being described in the survey		
School level		
Elementary school	651	58.6
Middle school/junior high	203	18.3
High school	256	23.1
Type of school		
Charter school	73	6.6
Public school	1037	93.4
Lunch participation		
0 days/week	130	11.7
1–4 days/week	468	42.2
5 days/week	512	46.1
Student race and ethnicity		
Hispanic	574	51.7
White	227	20.5
Asian	94	8.5
Black	93	8.4
Other race/multiracial	122	11.0
Student gender		
Girl	453	40.8
Boy	449	40.5
Other ^b	208	18.7
Free and reduced-price meal eligibility		
Free	484	43.6
Reduced-price	179	16.1
Noneligible	447	40.3

^aOther caregivers included grandparent, aunt/uncle, and legal guardian.

^bOther genders included nonbinary, transgender, more than 1 category, and preferred not to answer.

Frequency of school lunch consumption

Overall, parents reported that their child ate school lunch (served by the school and not brought from home) an average of 3.4 ± 1.8 days in a typical week in SY 2021–2022. Adjusted models found that parents reported that Black, White, and Hispanic students more frequently consumed school lunch than students in the other race/multiracial group ($P < .05$) (Figure 1).

Perceptions about school meal impacts on families

Most parents reported that school meals can save them money (81.6%) and time (79.2%), and can help reduce their stress (75.0%) (Table 2). Perceptions of these impacts did not vary by race and ethnicity ($P < .01$), except that parents of White students were more likely than parents of Hispanic students to report that school meals can help reduce family stress ($P = .003$).

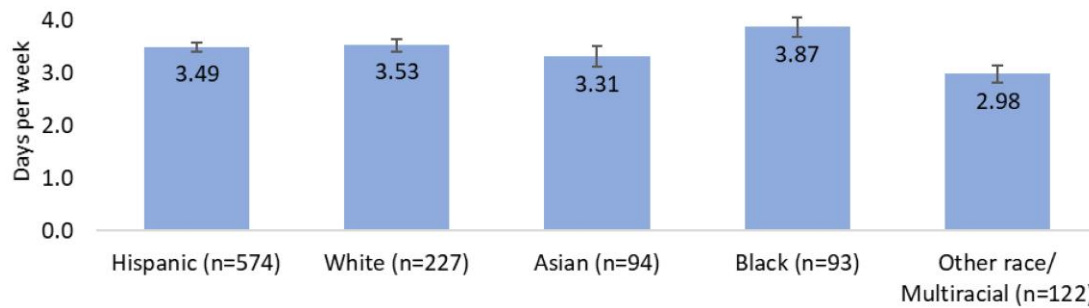


Figure 1. School lunch participation of students as reported by their parents in a study of perceptions of school meals among California parents of K–12 students, by race and ethnicity ($n = 1110$). Frequencies of school lunch participation were adjusted by school level, urbanicity, free and reduced-price meal eligibility, and the number of children under 18 years living with the parent using multiple linear regression models. School lunch participation of students in the Other race/Multiracial group was statistically significantly different than that of Hispanic, White, and Black students.

Table 2. Adjusted parental perceptions of school meal programs in a study of perceptions of school meals among California parents of K–12 students, by race and ethnicity ($n = 1050$).

	% ^a						Racial/ethnic differences ^b
	All ($n = 1110$), %	Hispanic (H) ($n = 574$)	White (W) ($n = 227$)	Asian (A) ($n = 94$)	Black (B) ($n = 93$)	Other race/multiracial (O) ($n = 122$)	
Perceptions about school meals impact on families							
School meals can save my family money	81.6	80.5	83.8	79.1	79.4	82.0	None
School meals can save my family time since we do not have to prepare a breakfast and/or lunch for my child	79.2	77.0	84.3	77.8	80.5	79.7	None
School meals can help to reduce stress for me/my family	75.0	71.1	82.0	79.0	81.9	76.3	H-W
Perceptions of school meals in terms of the school community							
Eating school meals may benefit students academically	57.5	59.8	58.3	47.7	61.0	53.1	None
School meals are only for children whose families have low incomes	17.9	17.0	20.0	26.2	15.1	14.1	None
My child is (or would be) embarrassed to eat school meals	11.7	9.5	16.0	14.5	13.9	12.2	H-W

The sample size in adjusted models is less than 1110 due to undetermined urbanicity for some parents ($n = 60$).

^aThe percentage of parents who reported agreeing or strongly agreeing with each perception was adjusted by school level, urbanicity, free and reduced-price meal eligibility, the total number of children under 18 years old that live with the parent, and frequency of lunch consumption using logistic regression.

^bThe statistical significance for pairwise comparisons is indicated in the “Differences” column with the pair of initials of the groups that are different from each other.

Perceptions of school meal impacts on the school community

Most parents reported that school meals can have a positive impact on students’ academic performance (57.5%) (Table 2). Few parents perceived that school meals are only for children whose families have low incomes (17.9%) or that their child would be embarrassed to eat school meals (11.7%). Parents of White students were more likely than parents of Hispanic students to report embarrassment related to eating school meals ($P = .01$), but no statistically significant differences by race and ethnicity were found related to school meals having a positive impact on students’ academic performance or school meals being only for children whose families have low incomes ($P > .01$).

Perceptions about school lunch

Most parents reported that their child chooses whether to eat the school lunch based on the menu that day (71.6%), that their child likes to eat school lunch to be with friends (64.7%), and that their child has enough time to eat lunch (54.2%) (Table 3). Parents of Asian students reported that

their child likes to eat school lunch to be with friends more often than parents of Hispanic students ($P = .006$). No statistically significant differences were found by race and ethnicity related to children choosing whether to eat school lunch based on the menu that day or having enough time to eat.

Less than half of parents perceived that their child can get enough food during school lunch to be full (46.0%), that the school lunch is healthy (44.0%), that their child thinks the school lunches taste good (39.6%), or that the quality of the school lunches is good (36.9%). Many of these perceptions differed by race and ethnicity in adjusted models, including the following: (1) parents of Hispanic students were less likely than parents of White students to report that their child thinks the school lunches taste good ($P = .004$), (2) parents of Hispanic students and students who identify with other races or are multiracial were less likely to report that school lunch offers meals that are healthy than were parents of White students ($P = .001$ and $P = .005$, respectively), and (3) parents of Hispanic students and parents of Asian students were less likely than parents of White students to report that the quality of the school lunches is good ($P = .0001$ and $P = .009$, respectively). No statistically significant differences by race and

Table 3. Adjusted parental perceptions of school lunch foods in a study of perceptions of school meals among California parents of K–12 students, by race and ethnicity ($n = 1050$).

	All ($n = 1110$), %	% ^a					Racial/ethnic differences ^b
		Hispanic (H) ($n = 574$)	White (W) ($n = 227$)	Asian (A) ($n = 94$)	Black (B) ($n = 93$)	Other race/ multiracial (O) ($n = 122$)	
Positive or neutral perceptions							
My child chooses whether to eat the school lunch based on the menu that day	71.6	71.7	72.3	65.5	74.5	71.9	None
My child likes to eat the school lunch to be with friends	64.7	59.8	66.0	74.7	68.9	73.6	H-A, H-O
My child has enough time to eat lunch at school	54.2	52.0	56.8	56.2	64.8	49.4	None
My child usually likes the lunches served at school	47.4	43.9	53.7	56.4	46.1	46.7	None
My child can get enough food at the school lunch to get full	46.0	44.4	52.2	43.0	39.0	49.6	None
The school lunch menu offers meals that are healthy	44.0	40.2	53.4	40.0	51.7	37.1	H-W, O-W
My child thinks the school lunches taste good	39.6	36.1	47.4	36.4	42.9	41.2	H-W
The quality of the school lunches is good	36.9	32.3	48.1	32.3	42.0	35.8	A-W, H-W
Negative perceptions							
My child gets tired of the same foods being served at school lunch	57.7	57.5	55.4	62.5	58.1	56.5	None
My child prefers to bring food from home or buy food off-campus instead of eating the school lunch	48.7	46.1	50.6	53.2	55.9	46.6	None
I would prefer my child to bring food from home or buy food off-campus instead of eating the school lunch	36.7	53.8	48.8	53.1	55.7	50.3	None
I have concerns about the amount of sugar in school lunches	34.3	39.8	24.4	46.3	26.6	26.8	A-B, A-O, A-W, H-B, H-O, H-W

The sample size in adjusted models is less than 1110 due to undetermined urbanicity for some parents ($n = 60$).

^aThe percentage of parents who reported agreeing or strongly agreeing with each perception was adjusted by school level, urbanicity, free and reduced-price meal eligibility, the total number of children under 18 years old that live with the parent, and frequency of lunch consumption using logistic regression.

^bThe statistical significance for pairwise comparisons is indicated in the “Differences” column with the pair of initials of the groups that are different from each other.

ethnicity were found related to children being able to get enough food ($P > .01$).

More than half of parents reported that their child gets tired of the same foods being served at lunch (57.7%), while less than half said that their child prefers to bring food from home (48.7%) and even fewer parents reported that they prefer that their child bring food from home or buy food off-campus (36.7%). These perceptions did not differ by race and ethnicity.

Approximately one-third of parents expressed concerns about the amount of sugar in school lunches (34.3%). Parents of Asian students were more concerned about sugar in school lunches than parents of White, Black, and students in the other race/multiracial group. Parents of Hispanic students were more concerned about sugar in school lunches than parents of White and students in the other race/multiracial group ($P < 0.01$).

Discussion

This study found that parents felt that UFSM provided by federal waivers in response to the COVID-19 emergency offered multiple benefits to their families, saving them money, time, and stress, and that the stigma associated with school meals was low. Parents also felt there was room for improving the variety, taste, and healthfulness of school lunches. Some parental perceptions differed by race and ethnicity. Particularly important is that parents of Hispanic and Asian students

reported less favorable perceptions of school meal quality, taste, and healthfulness than parents of White students.

The findings that most parents (75%) feel that school meals save their families money and time and reduce stress are consistent with a previous study of elementary school parents, where 79% reported that their child eating the school lunch saved time and made it easier for them.²¹ Similarly, a study evaluating perceptions of school lunches among US immigrant parents found that the convenience of school lunches enabled them to have more time for other important chores at home, and free school meals enabled them to save money for other necessities.³⁰ Our study finds that the perceived benefits of school meals are similar across racial and ethnic groups, thus highlighting the universal feeling of meal support under a UFSM program.

Few parents in this study perceived that school meals were only for children whose families have low incomes or that their children would be embarrassed to eat school meals. The level of stigma observed in the present study was lower than the level reported in a previous study conducted in Iowa in 2015, where 32.1% of parents said that school meals are to help families who are struggling financially to feed their children.⁴⁴ The lower rate of embarrassment or perception that school meals are only for low-income children in our study may be related to multiple factors, including the meals being free for all students during the period of this study, a higher adoption of the Community Eligibility Provision (CEP) since 2015, a higher adoption of CEP in California

than in Iowa, and differences in race and ethnicity characteristics between families in the Iowa and California studies.⁴⁵⁻⁴⁷ We did find that parents of White students in California had a higher perceived stigma associated with school meals than parents of Hispanic students. Future studies should examine whether levels of stigma associated with school meals are related to UFSM and whether this impacts experiences of equity among racial and ethnic groups. As more states adopt UFSM and a new generation of students enter kindergarten without exposure to means-tested school meals, it will be important to assess changes in stigma over time.

Many parents in this study reported negative perceptions of school meal quality, taste, healthfulness, and variety. For example, only 37% of parents reported that the school lunch is good quality and more than half of respondents in all racial/ethnic groups stated that their child gets tired of the same foods being served at school lunch. Importantly, this study was conducted during pandemic-related supply chain disruptions and school food service staffing challenges, which likely impacted menu variety and quality.^{3,14,48} Similar to our results, studies that evaluated parent perceptions of grab-and-go school meals during the pandemic found that some parents perceived the meals as unhealthy, unappealing, and repetitive.⁴⁹⁻⁵¹ Future studies should evaluate post-COVID-19 parental perceptions of school meals to better understand the extent to which pandemic circumstances impacted UFSM programs and to assess the impact of the state investments on school meal quality. However, our findings align with previous pre-pandemic studies showing that parents regard school meals as too processed and pre-packaged, and want to see more fruits, vegetables, salads, and scratch-cooked meals.⁴⁴ Additional research is needed to identify what schools will need to meet diverse student and parent meal preferences that will also meet school meal nutrition guidelines. While schools are making efforts to serve healthier school meals and to incorporate more scratch-cooked foods, studies have shown that most schools lack the facilities, kitchen equipment, staff, and/or funding that are necessary.¹³⁻¹⁵ To support the implementation of its UFSM program, the state of California appropriated \$150 million to fund school kitchen infrastructure upgrades, equipment, and food service staff training. Moreover, UFSM policies should prioritize providing the necessary resources for schools and districts to offer more appealing and healthier meals that meet the cultural needs of their students and future studies should evaluate the impact of state and federal investments on school meal quality.⁵²

Despite improvements in the nutritional quality of school meals since the implementation of the HHSFKA in 2010, other studies have shown that parent perceptions about school meals have not improved, and do not accurately reflect the nutritional quality of the meals served.^{20,32} In our study, 44% of parents thought the school lunch menu offered healthy meals. There are many potential explanations for the gap between the nutritional value of school meals and parent perceptions. For example, in response to updated school meal nutrition standards, the food industry reformulated popular foods to comply with USDA nutrition standards, such as corn dogs with whole grains and pizza with whole-grain crust and more vegetables.^{53,54} While reformulation changes the quantitative value of the school meal's nutrition, it would not be surprising that parents do not understand the differing product formulations available in schools and food retail, and therefore

perceive these school foods as unhealthy. Efforts to improve parent perceptions about the quality of school meals and changes to the level of processing in the meals themselves may be needed to maximize student participation and benefits from school meals.

We found differing parental perceptions about the quality, taste, and healthfulness of school meals by race and ethnicity, with Hispanic and Asian parents having more negative perceptions than White parents. Multiple factors could explain these differences, including cultural food norms that favor more fresh whole foods, schools' inability to offer adequate diversity of foods that meet students' racial and ethnic backgrounds, dietary restrictions due to medical needs, differences in the perceptions of immigrant parents about American foods, and disparities in the school food environment, among others.^{13,30,31,55,56} Prior studies have reported that school meals do not include enough culturally appropriate foods.^{30,31} One study assessing school breakfast perceptions among diverse immigrant families found that, when schools did not offer enough culturally appropriate hot foods, students were less likely to participate.³¹ The study also found that Hispanic parents, the only group to report nutrition concerns, thought that school breakfasts lacked fresh fruits and vegetables and included too much processed food and juice.³¹ Another study reported meal participation barriers among US immigrant parents, including parents' uncertainty about ingredients used in lunch preparation and concern that the meals contain excessive sugar and fat.³⁰ Additionally, dietary restrictions based on religion, due to lactose intolerance, or preferences for plant-based diets are more prevalent in some groups.^{56,57} However, schools often lack the resources necessary to address dietary needs adequately in meal programs, potentially leading to dissatisfaction. The perceptions of immigrant parents towards American foods also can play an important role in explaining the reported differences. Others have shown that some Latino parents perceived the US food culture as dominated by convenience and fast food, which can translate to skepticism about the healthfulness of school meals.⁵⁸ This may be compounded by a misunderstanding among immigrant parents about what constitutes processed food, leading to a perception of even minimally processed foods, such as frozen fruits and vegetables, as highly processed and therefore unhealthy.⁵⁵

Finally, disparities in the school food environment may also contribute to differing perceptions of parents.^{13,59} It has been reported that districts serving a majority of students of color in the United States use less scratch cooking compared with majority-White districts.¹³ Ongoing efforts are needed to ensure equitable meal quality across different school districts. Additional research is needed to better understand the cultural, dietary, and possibly socioeconomic factors driving these differences. This includes investigating how culturally inclusive menus impact student participation and satisfaction, and exploring how dietary restrictions common in certain racial or ethnic groups, such as lactose intolerance or plant-based preferences, influence perceptions and participation in school meal programs. Resources must be made available to ensure that school meals meet students' cultural preferences and parents' expectations of healthfulness.

Approximately one-third of parents reported concerns about the sugar content of school lunches and this concern was reported more by parents of Hispanic and Asian students than by parents of students from other groups. Although there

is evidence showing that the amount of added sugars in school meals has declined in recent years, a nationally representative study in the United States showed that the meals at most schools exceed the recommended limit for added sugars established in the Dietary Guidelines for Americans.^{60,61} In response to concerns from parents, teachers, health professionals, and other stakeholders, the USDA has proposed updates to the school nutrition standards that would include limits on the amount of added sugar in school meals beginning in fall 2025.^{62,63}

While around half of the parents reported that their child has enough time to eat lunch (54%), for parents with students in schools with inadequate time to eat, a prior systematic review suggests that this likely presents a barrier to meal participation and consumption.^{64,65} A previous study conducted in California found that students in schools with longer lunch periods had higher odds of eating fruits and vegetables at lunch than students in schools with shorter lunch periods.⁶⁶ Similarly, a study in Massachusetts found that students who did not have sufficient time to eat were less likely to select a fruit and consumed less of their selected entrée, milk, and vegetable in comparison with students with enough time to eat.⁶⁵

Consistent with other studies, we found that Black students had the highest rate of school lunch participation.^{19,20} School meal perceptions among parents of Black students tended to be similar to parents of White students and generally more favorable than parents of students of other races or ethnicities, although this was not statistically significant, likely due to sample size limitations. Parental reports of school lunch participation of students identifying as Asian, Hispanic, and multiracial or other race or ethnicity tended to be lower than those of White and Black students, although this difference was not statistically significant. Our data showed a trend in which parents of students in the racial and ethnic groups expressing more favorable perceptions of school meal quality, taste, and healthfulness also reported slightly higher participation rates than those of students in the racial and ethnic groups with parents with less favorable perceptions. This trend is consistent with findings from other studies that reported an association between parental perceptions and their child's school meal participation.^{18,19,21,67} It would be important to assess the degree to which White and Black parents perceive US food culture norms to be healthy compared with Hispanic and Asian parents. Work to improve school meals to provide foods that meet the higher standards of Asian and Hispanic parents may be beneficial to all students. At the same time, ensuring that parents are aware of the healthfulness of meals served also is critical, particularly given how beneficial they feel the meals are for their family's stress and finances.

Strengths of this study include a large sample of parents that reflect the distribution of socioeconomic level and race and ethnicity of the state's student population. Additionally, the study was conducted during a critical time when school meals were provided free of charge to all students across the nation, and little is known about providing meals in this context.

The study has several limitations, including the small sample sizes for some racial groups, which limited statistical power and required the collapsing of some racial categories into an "Other race/Multiracial" category. Another limitation is that we do not know the source of parents' perceptions about school meals as we did not collect information from schools on their meal programs. Parents' perceptions could stem from personal observations, feedback from their

children, or communication from schools, and may not accurately reflect the actual quality of the school meals.³² Whether accurate or not, parent perceptions are important because they can influence a child's decision to participate in school meal programs.^{20,21} Another limitation is that our sample only included parents who spoke English or Spanish. This could have resulted in the exclusion of less acculturated or foreign-born parents who speak languages other than Spanish and whose perceptions about school meals might be different from those of more acculturated parents or parents born in the United States. Another limitation is that the quantitative nature of these analyses did not allow us to identify the cause of the differences in parental perceptions by race and ethnicity. Future qualitative research is needed to more deeply investigate the causes of differences in parent perceptions about school meals. The study used the Bonferroni correction, which can be overly conservative when a high number of pairwise tests is conducted, risking type II errors (inability to detect a true difference).⁶⁸ Additionally, selection bias may have occurred because the survey link closed after meeting our response targets, so only parents who responded to the survey quickly could participate. Parents who agreed to participate may have stronger opinions about school meals than those who did not. Additionally, we recognize that school level (elementary, middle, or high) could affect parental perceptions and awareness about the qualities of school meals. However, the sample size of our study restricted our ability to conduct a stratified analysis by race ethnicity and school level. These limitations highlight the need for future research with larger and more diverse samples that can explore these interrelations in greater depth. Finally, data collection during the COVID-19 pandemic may have impacted parent perceptions due to pandemic-related changes to school menus and cafeteria operations.

Conclusion

The results of this study highlight the positive effects of UFSM policies, demonstrating their role in reducing family stress and financial burden, as well as the stigma associated with school meals. Notably, the positive effects extend across different racial and ethnic groups. However, the study identified the need to improve the variety, cultural appropriateness, taste, and healthfulness of school lunches. Parents of Hispanic and Asian students had less favorable perceptions of school meal quality, taste, and healthfulness than parents of White students. The perceived benefits associated with school meals and the perceptions of repetition in school menus were shared across parents of students from all race and ethnicity groups. Ensuring that meals meet students' cultural preferences and parents' expectations of healthfulness, while challenging, is a critical ongoing pursuit.

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Contribution statement

L.D.R. and W.G. contributed equally as joint senior authors.

Supplementary material

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Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as [supplementary materials](#).

Notes

1. US Department of Agriculture. National school lunch program. Accessed February 17, 2023. <https://www.ers.usda.gov/topics/food-nutrition-assistance/child-nutrition-programs/national-school-lunch-program/>
2. US Department of Agriculture. School breakfast program. 2022. Accessed February 17, 2023. <https://www.ers.usda.gov/topics/food-nutrition-assistance/child-nutrition-programs/school-breakfast-program/>
3. Food Research and Action Center. Large school district report operating school nutrition programs during the pandemic. 2022. Accessed May 27, 2022. <https://frac.org/wp-content/uploads/large-school-district-report-2022.pdf>
4. US Department of Agriculture. Child nutrition COVID-19 waivers. Accessed May 27, 2022. <https://www.fns.usda.gov/fns-disaster-assistance/fns-responds-covid-19/child-nutrition-covid-19-waivers>
5. US Department of Agriculture. Child nutrition COVID-19 waivers from previous school years. Accessed May 27, 2022. <https://www.fns.usda.gov/fns-disaster-assistance/fns-responds-covid-19/child-nutrition-covid-19-waivers-previous-school-years>
6. Food Research and Action Center. RAISE YOUR HAND for Healthy School Meals for All. Accessed January 3, 2024. <https://frac.org/healthy-school-meals-for-all>
7. Au L, Gurzo K, Gosliner W, Webb K, Crawford P, Ritchie L. Eating school meals daily is associated with healthier dietary intakes: the healthy communities study. *J Acad Nutr Diet*. 2018;118(8):1474-1481, e1. <https://doi.org/10.1016/J.JAND.2018.01.010>
8. Story M, Miller L, Lott M. The school nutrition and meal cost study—I: overview of findings related to improving diet quality, weight, and disparities in US children and policy implications. *Nutrients*. 2021;13(4):1357. <https://doi.org/10.3390/NU13041357>
9. Gearan E, Fox MK. Updated nutrition standards have significantly improved the nutritional quality of school lunches and breakfasts. *J Acad Nutr Diet*. 2020;120(3):363-370. <https://doi.org/10.1016/J.JAND.2019.10.022>
10. Kinderknecht K, Harris C, Jones-Smith J. Association of the healthy, hunger-free kids act with dietary quality among children in the US national school lunch program. *JAMA*. 2020;324(4):359-368. <https://doi.org/10.1001/JAMA.2020.9517>
11. Liu J, Micha R, Li Y, Mozaffarian D. Trends in food sources and diet quality among US children and adults, 2003-2018. *JAMA Network Open*. 2021;4(4):e215262. <https://doi.org/10.1001/JAMANETWORKOPEN.2021.5262>
12. US Department of Agriculture. School nutrition and meal cost study final report volume 1: school meal program operations and school nutrition environments. 2019. Accessed January 3, 2024. <https://fns-prod.azureedge.us/sites/default/files/resource-files/SNMCS-Vol1.pdf>
13. Vincent JM, Gunderson A, Friedman D, McKee-Brown A, Wilson S, Gomez V. Are California Public Schools Scratch-Cooking Ready? A survey of food service directors on the state of school kitchens. 2020. Accessed November 9, 2023. https://citiesandschools.berkeley.edu/uploads/CC+S_Scratch_Cooking_EXEC_SUM_Final_Nov_2020.pdf
14. Zuercher MD, Cohen JFW, Hecht CE, Hecht K, Ritchie LD, Gosliner W. Providing school meals to all students free of charge during the COVID-19 pandemic and beyond: challenges and benefits reported by school foodservice professionals in California. *Nutrients*. 2022;14(18):3855. <https://doi.org/10.3390/NU14183855>
15. US Department of Agriculture. Results of USDA's food and nutrition service-administered school food authority survey II on supply chain disruption and student participation. 2023. Accessed November 17, 2023. <https://fns-prod.azureedge.us/sites/default/files/resource-files/SFASurvey-II-Supply-Chain-072523.pdf>
16. Mirtcheva DM, Powell LM. Participation in the national school lunch program: importance of school-level and neighborhood contextual factors. *J Sch Health*. 2009;79(10):485-494. <https://doi.org/10.1111/j.1746-1561.2009.00438.x>
17. Hecht A, Olarte D, McLoughlin G, Cohen J. Strategies to increase student participation in school meals in the United States: a systematic review. *J Acad Nutr Diet*. 2023;2(7):1075-1096.e1. <https://doi.org/10.1016/J.JAND.2023.02.016>
18. Askelson N, Golembiewski E, Ghattas A, Williams S, Delger P, Scheidel C. Exploring the parents' attitudes and perceptions about school breakfast to understand why participation is low in a rural Midwest state. *J Nutr Educ Behav*. 2017;49(2):107-116.e1. <https://doi.org/10.1016/J.JNEB.2016.10.011>
19. Ohri-Vachaspati P. Parental perception of the nutritional quality of school meals and its association with students' school lunch participation. *Appetite*. 2014;74:44-47. <https://doi.org/10.1016/J.APPET.2013.10.024>
20. Martinelli S, Acciai F, Au L, Yedidia M, Ohri-Vachaspati P. Parental perceptions of the nutritional quality of school meals and student meal participation: before and after the healthy hunger-free kids act. *J Nutr Educ Behav*. 2020;52(11):1018-1025. <https://doi.org/10.1016/J.JNEB.2020.05.003>
21. Lambert L, Conklin M, Johnson JT. Parental beliefs toward the national school lunch program related to elementary student participation. *J Child Nutr Manag*. 2002;26(1):1-9.
22. Bailey-Davis L, Virus A, McCoy TA, Wojtanowski A, Vander Veer SS, Foster GD. Middle school student and parent perceptions of government-sponsored free school breakfast and consumption: a qualitative inquiry in an urban setting. *J Acad Nutr Diet*. 2013;113(2):251-257. <https://doi.org/10.1016/j.jand.2012.09.017>
23. Watts A, Araiza AL, Fernández CR, et al. The campaign for universal free lunch in New York City: lessons learned. *Pediatrics*. 2021;148(4):e2020049734. <https://doi.org/10.1542/peds.2020-049734>
24. Forrestal S, Potamites E, Guthrie J, Paxton N. Associations among food security, school meal participation, and students' diet quality in the first school nutrition and meal cost study. *Nutrients*. 2021;13(2):1-13. <https://doi.org/10.3390/NU13020307>
25. US Department of Agriculture. Household food security in the United States in 2021. 2022. Accessed January 3, 2024. <https://www.ers.usda.gov/webdocs/publications/104656/err-309.pdf>
26. Potamites E, Gordon A. Children's Food Security and Intakes from School Meals: Final Report. 2010. Accessed January 3, 2024. <https://www.ers.usda.gov/webdocs/publications/84357/ccr-61.pdf?v=274.6>
27. Ralston K, Treen K, Coleman-Jensen A, Guthrie J. Children's food security and USDA child nutrition programs. 2017. Accessed April 19, 2023. <https://www.ers.usda.gov/webdocs/publications/84003/eib-174.pdf?v=6041.7>
28. US Department of Agriculture. Food security and nutrition assistance. Accessed April 13, 2023. <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/food-security-and-nutrition-assistance/#:~:text=The%20prevalence%20of%20food%20insecurity,had%20very%20low%20food%20security>
29. Atkin AL, Christophe NK, Stein GL, Gabriel AK, Lee RM. Race terminology in the field of psychology: acknowledging the growing multiracial population in the U.S. *Am Psychol*. 2022;77(3):381-393. <https://doi.org/10.1037/amp0000975>

30. Obeng-Gyasi E, Antwi G, Obeng C. Food is environmentally and culturally specific! A preliminary qualitative study on U.S. immigrant parents' perceptions of school lunch. *Eur J Investig Health Psychol Educ.* 2019;10(1):240-249. <https://doi.org/10.3390/EJIHPE10010019>
31. Greves M, Lozano P, Liu L, Busby K, Cole J, Johnston B. Immigrant families' perceptions on walking to school and school breakfast: a focus group study. *Int J Behav Nutr Phys Act.* 2007;4(1):64. <https://doi.org/10.1186/1479-5868-4-64>
32. Martinelli S, Acciai F, Yedidia M, Ohri-Vachaspati P. Do parental perceptions of the nutritional quality of school meals reflect the food environment in public schools? *Int J Environ Res Public Health.* 2021;18(20):10764. <https://doi.org/10.3390/IJERPH182010764>
33. Diaz CL, Watson KE. Racial/ethnic health disparities in cardiovascular disease during the COVID-19 pandemic: revisiting a long-lasting problem. *Cardiovasc Res.* 2022;118(1):e8-e10. <https://doi.org/10.1093/cvr/cvab318>
34. California Department of Education. Fingertip facts on education in California. Accessed October 9, 2023. <https://www.cde.ca.gov/ds/ad/ceffingertipfacts.asp>
35. California Department of Education. Selected statewide data for the year 2021-22. Accessed October 9, 2023. <https://dq.cde.ca.gov/dataquest/Cbeds1.asp?FreeLunch=on&cChoice=StatProf1&cYear=2021-22&cLevel=State&cTopic=FRPM&myTimeFrame=S&submit1=Submit>
36. Galloway Research Service. Homepage. Accessed October 9, 2023. <https://www.gallowayresearch.com/>
37. US Department of Agriculture. School nutrition and meal cost study—data collection instruments. 2019. Accessed October 10, 2023. <https://fns-prod.azureedge.us/sites/default/files/resource-files/SNM-CS-DataCollection-Instruments.pdf>
38. Smith S, Cunningham-Sabo L, Auld G. Satisfaction of middle school lunch program participants and non-participants with the school lunch experience. *J Child Nutr Manag.* 2015;39(2). <https://schoolnutrition.org/journal/fall-2015-satisfaction-of-middle-school-lunch-program-participants-and-non-participants-with-the-school-lunch-experience/>
39. Machado SS, Ritchie LD, Thompson HR, Madsen KA. The impact of a multi-pronged intervention on students' perceptions of school lunch quality and convenience and self-reported fruit and vegetable consumption. *Int J Environ Res Public Health.* 2020;17(16):5987.
40. Hailu A, Wasserman C. Guidelines for using rural-urban classification systems for community health assessment. 2016. Accessed January 3, 2024. <https://doh.wa.gov/sites/default/files/legacy/Documents/1500/RUCAGuide.pdf>
41. US Department of Agriculture. Rural-urban commuting area codes. Accessed October 9, 2023. <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/>
42. Federal Register. Child nutrition programs: income eligibility guidelines. Accessed October 9, 2023. <https://www.federalregister.gov/documents/2021/03/04/2021-04452/child-nutrition-programs-income-eligibility-guidelines>
43. US Department of Agriculture. Results of the U.S. Department of Agriculture, Food and Nutrition Service-Administered School Food Authority Survey on supply chain disruptions. 2022. Accessed May 23, 2022. <https://fns-prod.azureedge.us/sites/default/files/resource-files/FNS-Survey-Supply-Chain-Disruptions.pdf>
44. Golembiewski E, Askelson N, Elchert D, Leicht E, Scheidel C, Delger P. From policy to practice: parent perceptions of the 2010 federal school lunch mandate. *J Child Nutr Manag.* 2015;39(1):1-13.
45. Food Research and Action Center. Community eligibility: the key to hunger-free schools school year 2020-2021. 2021. Accessed May 23, 2022. <https://frac.org/wp-content/uploads/CEP-Report-2021.pdf>
46. Food Research and Action Center. State lists of schools that can adopt community eligibility for SY 2023–2024. Accessed November 9, 2023, <https://frac.org/cep-map/cep-map.html>
47. Food Research and Action Center. Community eligibility: the key to hunger-free schools—school year 2022–2023. 2023. Accessed November 9, 2023. <https://frac.org/wp-content/uploads/cep-report-2023.pdf>
48. Cohen J, Polacsek M, Hecht C, et al. Implementation of universal school meals during COVID-19 and beyond: challenges and benefits for school meals programs in Maine. *Nutrients.* 2022;14(19):4031. <https://doi.org/10.3390/NU14194031>
49. Cadenhead J, McCarthy J, Nguyen T, Rodriguez M, Koch P. Qualitative study of participation facilitators and barriers for emergency school meals and pandemic electronic benefits (P-EBT) in an urban setting during COVID-19. *Nutrients.* 2022;14(16):3358. <https://doi.org/10.3390/NU14163358>
50. Jowell A, Bruce J, Escobar G, Ordonez V, Hecht C, Patel A. Mitigating childhood food insecurity during COVID-19: a qualitative study of how school districts in California's San Joaquin Valley responded to growing needs. *Public Health Nutr.* 2021;26:1063-1073. <https://doi.org/10.1017/S1368980021003141>
51. Sohlberg T, Higuchi E, Ordonez V, et al. Parent perception of school meals in the San Joaquin Valley during COVID-19: a photo-voice project. *Nutrients.* 2023;15(5):1087. <https://doi.org/10.3390/NU15051087>
52. California Department of Education. Kitchen infrastructure and training funds. Accessed October 9, 2023, <https://www.cde.ca.gov/ls/nu/kitfunds.asp>
53. Federal Register. Nutrition standards in the national school lunch and school breakfast programs 2012. Accessed January 30, 2023. <https://www.govinfo.gov/content/pkg/FR-2012-01-26/pdf/2012-1010.pdf>
54. Federal Register. Restoration of milk, whole grains, and sodium flexibilities. 2020. Accessed January 30, 2023. <https://www.govinfo.gov/content/pkg/FR-2020-11-25/pdf/2020-25761.pdf>
55. Bleiweiss-Sande R, Goldberg J, Evans EW, Chui K, Sacheck J. Perceptions of processed foods among low-income and immigrant parents. *Health Educ Behav.* 2020;47(1):101-110. <https://doi.org/10.1177/1090198119885419>
56. Friends of the Earth. Plant-based trends in California's school lunches a progress report on climate-friendly school food. 2023. Accessed November 15, 2023. https://foe.org/wp-content/uploads/2023/09/Plant-Based-Trends-in-California-School-Lunches_Final.pdf
57. Malik TF, Panuganti KK. Lactose intolerance. Accessed November 15, 2023, <https://www.ncbi.nlm.nih.gov/books/NBK532285/>
58. Martinez SM, Rhee KE, Blanco E, Boutelle K. Latino mothers' beliefs about child weight and family health. *Public Health Nutr.* 2017;20(6):1099-1106. <https://doi.org/10.1017/s1368980016002962>
59. Bardin S, Washburn L, Gearan E. Disparities in the healthfulness of school food environments and the nutritional quality of school lunches. *Nutrients.* 2020;12(8):2375. <https://doi.org/10.3390/NU12082375>
60. Fox MK, Gearan E, Schwartz C. Added sugars in school meals and the diets of school-age children. *Nutrients.* 2021;13(2):471. <https://doi.org/10.3390/NU13020471>
61. Vernarelli J, O'Brien B. A vote for school lunches: school lunches provide superior nutrient quality than lunches obtained from other sources in a nationally representative sample of US children. *Nutrients.* 2017;9(9):924. <https://doi.org/10.3390/NU9090924>
62. US Department of Agriculture. Proposed updates to the school nutrition standards. Accessed October 9, 2023. <https://www.fns.usda.gov/cn/proposed-updates-school-nutrition-standards>
63. US Department of Agriculture. Added sugars. Accessed February 14, 2023. <https://www.fns.usda.gov/cn/nutrition-standards-proposed-rule-added-sugars>

64. Cohen J, Hecht A, Hager E, Turner L, Burkholder K, Schwartz M. Strategies to improve school meal consumption: a systematic review. *Nutrients*. 2021;13(10):3520. <https://doi.org/10.3390/NU13103520>
65. Cohen J, Jahn J, Richardson S, Cluggish S, Parker E, Rimm E. Amount of time to eat lunch is associated with children's selection and consumption of school meal entrée, fruits, vegetables, and milk. *J Acad Nutr Diet*. 2016;116(1):123-128. <https://doi.org/10.1016/j.jand.2015.07.019>
66. Gosliner W. School-level factors associated with increased fruit and vegetable consumption among students in California middle and high schools. *J Sch Health*. 2014;84(9):559-568. <https://doi.org/10.1111/JOSH.12188>
67. Spruance L, Harrison C, Brady P, Woolford M, LeBlanc H. Who eats school breakfast? Parent perceptions of school breakfast in a state with very low participation. *J Sch Health*. 2018;88(2):139-149. <https://doi.org/10.1111/JOSH.12597>
68. VanderWeele T, Mathur M. Some desirable properties of the Bonferroni correction: is the Bonferroni correction really so bad? *Am J Epidemiol*. 2019;188(3):617-618. <https://doi.org/10.1093/AJE/KWY250>