



Published in final edited form as:

J Nutr Educ Behav. 2020 November ; 52(11): 1018–1025. doi:10.1016/j.jneb.2020.05.003.

Parental Perceptions of the Nutritional Quality of School Meals and Student Meal Participation: Before and After the Healthy Hunger-Free Kids Act

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Abstract

Objectives: To examine (1) parental perceptions of school meals and (2) student meal participation before and after the implementation of the Healthy Hunger-Free Kids Act (HHFKA).

Design: Data were collected from telephone surveys of 2 independent cross-sectional panels in New Jersey (2009–2010 and 2016–2017).

Participants: Households with children aged 7–18 years (pre-HHFKA: n = 1,027; post-HHFKA: n = 324).

Main Outcome Measures: Parental perception of school meals and parental reports of student participation in school meals.

Analysis: Multivariable logistic regression models were developed to examine outcome variables. For school meal participation, nested models were analyzed first controlling for sociodemographic variables, followed by parental perception, and then the interaction between perception and time.

Results: Parental perceptions of school meals did not change significantly after the HHFKA. At both time points, school meal participation rates were significantly higher for children of parents who perceived school meals as healthy compared with children whose parents perceived meals to be unhealthy (pre-HHFKA: 89.9% vs 75.1%, $P < 0.001$; post-HHFKA: 87.3% vs 64.9%, $P = 0.02$).

Conclusion and Implications: Because higher perception of school meal quality is associated with higher participation, it is important for school food programs to inform parents about the improved nutritional quality of school meals.

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Conflict of Interest Disclosure: The authors have not stated any conflicts of interest.

Keywords

Healthy Hunger-Free Kids Act; perception; parents; nutrition policy; National School Lunch Program

INTRODUCTION

In 2018, 29.6 million students participated in the US Department of Agriculture's *National School Lunch Program* (NSLP); the majority (74.3%) of these students qualified for either free or reduced-price meals.¹ However, despite an overall higher participation rate compared with students who do not qualify for meal benefits, 21% of students who were certified for free meals and 27% of students who were certified for reduced-price meals did not participate in the program.² Understanding factors that influence participation rates is important, given how the NSLP can positively contribute to the overall diet quality of students who participate in the program, especially those from low-income households.³

The Healthy Hunger-Free Kids Act (HHFKA), enacted in 2010, required schools to increase the nutritional quality of NSLP reimbursable meals; in particular, schools were required to offer meals that meet grade-specific calorie limits and provide less sodium and fat, and more fruits, vegetables, and whole grains.⁴ Popular media channels initially reported harsh criticism from students and teachers about the updated nutritional guidelines.^{5,6} Despite the criticism that was widely covered in the media, evidence suggests that parents and students did, in fact, support the updated nutrition guidelines for school meals, even though they also acknowledged that the quality and palatability of the healthier items served could be improved.^{7,8}

Research has shown that since the implementation of the HHFKA, the nutritional quality of school lunch meals has improved.^{9–12} Johnson and colleagues¹¹ compared school meals before and after the HHFKA in 3 high schools and 3 middle schools in Washington State and found that meals chosen by students after HHFKA implementation were less energy-dense and provided a greater proportion of key nutrients, such as calcium, iron, and fiber, compared with meals chosen before the implementation of the HHFKA. Students also consume more fruits and vegetables from the lunch line since HHFKA enactment.^{9–12} Although there were initial reports of drops in participation as a result of the HHFKA, a study examining school meal participation over 7 years (2008–2009 to 2014–2015) in 4 low-income cities in New Jersey showed that overall NSLP participation rates remained stable at about 71% for all students, whereas they increased slightly for students who qualified for free or reduced-price meals, from 71% in 2008–2009 to 73% in 2014–2015.¹³

A number of factors influence student participation in school meals. Participation rates are consistently higher among elementary school students than among middle or high school students.^{14,15} Similarly, students eligible for free or reduced-price meals participate at higher rates than do students who are not certified for meal benefits.^{1,2,11,16} Participation also increases when schools take part in the HHFKA's Community Eligibility Provision, which reduces barriers to participation by providing free meals to all students.^{17,18} For students purchasing full-price meals, meal price plays an important role in participation decisions;

a 1% increase in meal price is associated with almost the same drop (0.81%) in average daily participation.¹⁴ Family characteristics can also play a role. For instance, as mother's education level rises, the likelihood of participation in NSLP drops, an association that may be related to increased family income.^{15,19}

Parents play a key role in influencing children's eating habits through the environment they provide at home, the feeding style they implement during meals, and their own beliefs and attitudes about food.^{20,21} Parents' beliefs and perceptions about school meals have the potential to impact student participation. Previous studies have shown positive associations between parents' perceptions of the nutritional quality of NSLP meals and participation in both NSLP^{21,22} and the *School Breakfast Program*.^{23,24} To the authors' knowledge, however, no studies have examined the association between parental perceptions of the nutritional quality of school meals and student meal participation both before and after HHFKA implementation. In light of the positive changes to the nutritional quality of meals since the implementation of the HHFKA, exploring this relationship will provide important information about how parents' perceptions have changed in response to HHFKA guidelines and whether those perceptions impacted student participation in school meals.

The current study has 2 objectives: the first is to compare parents' perceptions of the healthfulness of school meals before and after implementation of the HHFKA; the second is to examine the association between parental perception and children's participation in school meals, and whether this association changed after implementation of the HHFKA.

METHODS

Data were obtained from the New Jersey Child Health Study (NJCHS), a longitudinal study that examines the impact of the food and physical activity environment on children's weight and health outcomes. The study collected data on a child and an adult (typically a parent) living in the home using a household survey in 5 predominately low-income urban cities in New Jersey: Camden, New Brunswick, Newark, Trenton, and Vineland.

Household Survey

The NJCHS collected survey data using phone interviews from 2 panels (panel 1 and panel 2) of households with children, at 2 time points, between 2009 and 2017. For this secondary analysis, data collected from 2 cross-sectional panels were compared. Data collected at panel 1, time 1 in 2009–2010 (n = 1,708) provided information for the pre-HHFKA period. Households were selected using a random digit dialing of landline telephone numbers associated with the study cities. Households were eligible if they were located within the study city limits, had a child in the home aged between 3 and 18 years, and spoke English or Spanish. A multi-call design was used to ensure households were reached across different days of the week and at different times of the day. The targeted respondent was an adult (parent or grandparent in 94% of cases), aged at least 18 years, and primarily responsible for food purchasing decisions for the family. Data were collected on the respondent and 1 child who was related to the respondent through blood or marriage. When multiple children aged 3–18 years lived in the household, a computer program randomly selected 1 child to be the *index child* for the study. On average, the survey took 36 min to complete, and respondents

were given \$10 for their time. Data representing the post-HHFKA period were obtained from panel 2, time 2 interviews conducted in 2016–2017, allowing for full implementation of the HHFKA guidelines and exposure of parents and students to the new school meals. The panel 2 data collection procedures were similar to those of panel 1, except panel 2 did not include data from Vineland and included children aged 7–18 years. Post-HHFKA data were available from 353 households.

Informed consent was obtained at the beginning of the time 1 phone survey in both panels. The Arizona State University and Rutgers University Institutional Review Boards approved the study protocol.

Household Survey Content

Parents were asked to report demographic and socioeconomic characteristics for the index child, including age, sex, and race/ethnicity, if the child received free and reduced-price meals at school (0 = No, 1 = Yes), and mother's highest level of education. Children were grouped into 2 age groups (7–11 and 12–18 years), and into 3 race/ethnicity categories (non-Hispanic Black, non-Hispanic White/other, and Hispanic). Mother's education was categorized as less than high school, high school, and at least some college. To assess their perception of school meals, parents were asked: "Regardless of whether or not [index child] eats foods provided by his/her school, how would you rate the nutritional quality of foods offered at [index child's] school?" Answer options were on a 4-point Likert scale, which included: *very unhealthy*, *unhealthy*, *healthy*, and *very healthy*, with the option to refuse or select *I don't know* or *school does not provide food*. The variable was collapsed into 2 categories by combining the 2 unhealthy response options into *unhealthy* and the 2 healthy response options into *healthy*. This question was used in a previous analysis examining the role of parent perception in children's school meal participation.²² To measure participation in the NSLP parents were then asked, "On most days, does [index child] have a lunch served by the school?" and respondents could select *yes* or *no*.²⁵

Analytical Sample

The analytical sample for this study was limited to households with children between 7 and 18 years old who had no missing responses on all independent and dependent variables used in the analysis (n = 1,027 for panel 1 and n = 324 for panel 2). Students were retained in the sample irrespective of whether they attended public or private schools, as over 97% of all schools in New Jersey participate in the NSLP.²⁶ Given the difference in sample sizes between pre- and post-HHFKA samples, propensity score matching was used to balance the samples across the 2 time points. However, the findings based on the matched sample did not change; therefore, for simplicity, models from the original sample without propensity score matching are presented.

Data Analysis

This study is a secondary data analysis of a larger study; therefore, the analytical plan, research questions, and hypotheses were developed before data analysis but not data collection. Logistic regression analyses were used to examine the parental perception of school meals before and after the implementation of the HHFKA. All models controlled

for demographic and socioeconomic characteristics, such as age, sex, and race of the child, free and reduced-price meal eligibility, and mother's education. The models also adjusted for clustering at the city level and included sampling weights to account for the complex survey design. Participation in school meals was first examined, controlling only for the demographic and socioeconomic variables listed above and time (pre- and post-HHFKA). Next, the variable capturing parents' perception of school meals was added to the model, followed by its interaction with time. This interaction term tested whether the relationship between parental perception and school meal participation changed over time (ie, pre- vs post-HHFKA). The adjusted mean participation was calculated after controlling for all covariates in the model. Finally, adjusted mean participation in each of the perception categories at both time points was examined to see if they were significantly different from each other. All analyses were run using Stata statistical software (version 15.1, StataCorp LLC, College Station, TX, 2017).

RESULTS

Descriptive Statistics

Table 1 shows the demographic information of students in the sample, as reported by the adult respondent. The sample was comprised primarily of non-Hispanic Black and Hispanic students. Most students in the sample (nearly 70%) were eligible for free and reduced-price meals, and more than 80% of all students participated in the NSLP at both time points. Similarly, approximately 80% of parents rated school meals as healthy at both time points. Despite the unbalance in sample size at the 2 time points, the samples were well matched on most relevant demographics.

Parental Perceptions

Parental perception of school meals was not significantly different across the 2 time points in both unadjusted ($P = 0.61$) (Table 1) and adjusted analysis ($P = 0.61$) (Table 2). The only covariate associated with parental perception was students' age, with parents of older students (aged 12–18 years) having 36% lower odds ($P = 0.02$) of rating school meals as healthy compared with parents of younger students (aged 7–11 years).

Student Participation

Model 1, examining parent-reported school meal participation controlling only for demographic and socioeconomic characteristics (Table 3), found that the odds of participating in school meals did not change after implementation of the HHFKA ($P = 0.33$). Students receiving free or reduced-price meals had 5 times higher odds of participating in school meals compared with those who did not ($P < 0.001$). In addition, non-Hispanic Black and Hispanic students had roughly twice the odds of participating in school meals ($P = 0.01$ and $P = 0.05$, respectively) than did non-Hispanic White/other students. When parent perception was added to the model, the significant associations between participation and the other variables observed in model 1 stayed approximately the same. Overall, children of parents who perceived school meals as healthy had 3.8 times higher odds of participating in school meals than did students whose parents perceived the meals to be unhealthy ($P < 0.001$). In model 3, the interaction term between time point and parental perception was not

significant ($P = 0.65$), suggesting that the association between perception and school meal participation did not change over time (pre- vs post-HHFKA).

Based on estimates from model 3, the Figure shows school meal participation rates both before and after HHFKA implementation and differentiates participation levels by the parental perception of school meal healthfulness. Compared with students whose parents perceived school meals to be unhealthy, school meal participation rates were significantly higher for students of parents who perceived school meals as healthy, both before (89.9% vs 75.1%, $P < 0.001$) and after HHFKA implementation (87.3% vs 64.9%, $P = .02$). Adjusted rates of school meal participation were not significantly different across the 2 panels (pre- and post-HHFKA) overall (86.6% vs 82.3%) or when comparing students whose parents perceived the meals to be unhealthy (75.1% vs 64.9%) or healthy (89.9% vs 87.3%).

DISCUSSION

This study examined the relationship between parental perception of school meal healthfulness and parent-reported student participation in school meals before and after implementation of the HHFKA in a predominately low-income, urban population in New Jersey. Overall, compared with pre-HHFKA, neither student participation nor parents' perception of school meals changed in the study sample after HHFKA implementation. These results do not support the hypotheses that after HHFKA implementation (1) a greater proportion of parents would rate school meals as healthy, and (2) more students would participate in school meals. However, a strong positive association between parental perception of school meals and school meal participation at both time points was observed. Similar to prior studies, the current results confirm that students who receive free and reduced-price meal benefits are more likely to participate in school meals.^{1,2,11,16} The HHFKA's Community Eligibility Provision has been shown to increase school meal participation by removing application barriers and reducing stigma.^{17,18} However, in this sample, school meal participation rates did not change over time, likely because of the high rates of free and reduced-price eligibility (70%) at both time points.

The current analysis shows that parental perception of school meals did not change, despite the documented improvements to the nutritional quality of the meals that occurred after HHFKA implementation,⁹⁻¹² including an increase in the availability of healthy items and a decrease in unhealthy items in school lunches in the study cities.²⁷ One potential issue that could be unclear to both students and parents is that schools offer familiar look-alike products, such as chicken nuggets or pizza, that might appear to be the same as before HHFKA guidelines went into effect.²⁸ However, after HHFKA implementation, these items are often lower in fat and sodium and contain whole grains,² changes that might not be immediately obvious to parents or students and could explain why the parental perception of the nutritional quality of school meals did not change after HHFKA implementation.²⁸ Interestingly, the only factor that was associated with parental perceptions was child's age; parents of older children were less likely to rate school meals as healthy. This finding might reflect changes in eating patterns and attitudes among older children, who are often seeking greater autonomy in their food choices.^{29,30} This, in turn, may prompt them to express

dislike for meal options provided in school cafeterias more strongly. It could also reflect an increased sense of stigma that, among adolescents, is associated with eating school meals.¹⁵

According to a nationwide poll taken in the fall of 2014, parents of school-age children overwhelmingly support robust nutrition standards for all foods served in schools, including requiring fruits and vegetables at each meal and limiting sodium levels.⁸ Similarly, most students support nutritional improvements in school meals, but they also think that implementation of nutritional guidelines could be improved to provide better quality or more palatable meals.⁷ Positive parental perception about the nutritional quality of school meals is associated with increased meal participation.²² However, the current study suggests that there is a gap between changes taking place in the school cafeteria and the apparent parental knowledge of those changes. Because parental perception of nutritional quality of school meals is associated with student participation in school meals, keeping parents well informed about the improvements in the nutritional quality of school meals and how they can contribute to an overall healthy diet is crucial. Furthermore, improving students' perception of school meals can also help increase participation, through students' own food preferences^{31,32} and how students communicate with their parents about school food options.³³

Participation in school meals is a necessary condition for the NSLP to achieve its mission of supporting a healthy diet for low-income students. The most common alternative to school meals is bringing lunch from home. Although this is undoubtedly better than skipping the meal altogether, bringing a lunch from home places a greater financial burden on families and may provide fewer nutritional benefits to students; in many cases, packed lunches have been shown to have fewer fruits, vegetables, and whole grains compared with school lunches.^{34,35}

There are several limitations to this study. The analysis is based on a repeated cross-sectional design, in which the pre- and post-HHFKA samples were derived from 2 independent panels. Therefore, the associations observed cannot be considered causal. Another potential limitation is that information on school meal participation was based on parent reports. Although there may be some discrepancies between parent reports and actual school meal participation, the focus of the study is on parents' perception of school meals. Therefore, in the context of the study, parent reports of whether their child eats at school are more meaningful.

Furthermore, there is the possibility of a social desirability bias, in that parents whose children participate in school meals might want to think that their children are receiving healthier meals and may be more inclined to report school meals as healthy. Although a more precise knowledge of the causal and temporal direction of the relationship between participation and perception would be helpful to tailoring effective interventions, the current study findings suggest that influencing parental perceptions will remain central to such efforts. Finally, although the sample is representative of the communities included in the study, the current findings might not be generalizable beyond urban, low-income, and ethnically and racially diverse communities. Information regarding parents' actual interaction with or specific knowledge of changes in the school food environment was not

available. Additional research should explore changes in parental perceptions on the basis of their awareness of and interaction with the school food system.

The main strength of the study is that participation rates and parental perceptions were examined before and after HHFKA, ensuring enough time for schools to implement the updated guidelines fully and for families to be exposed to the updated school lunch environment. Furthermore, the sample included high rates of free and reduced-price meal eligibility and therefore included those students who are most likely to benefit from school meals.

ACKNOWLEDGMENTS

The authors would like to thank the Eunice Kennedy Shriver National Institute of Child Health and Human Development Grant 1R01HD071583–01A1, the National Heart, Lung, and Blood Institute Grant R01HL137814, and the Robert Wood Johnson Foundation for their support of this work. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The funding source had no role in the collection, analysis, and interpretation of data, in the writing of the report, or in the decision to submit the article for publication.

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IMPLICATIONS FOR RESEARCH AND PRACTICE

Parental perception of the healthfulness of school meals did not change after implementation of the HHFKA, despite the improvements to the nutritional quality of school meals. This study also showed that parents' perception of the nutritional quality of school meals is likely to play a significant role in their children's participation in those meals. However, negative media coverage of school meals since the HHFKA might have played a role in shaping parental perceptions—perhaps more so than the coverage on research findings documenting improvements.

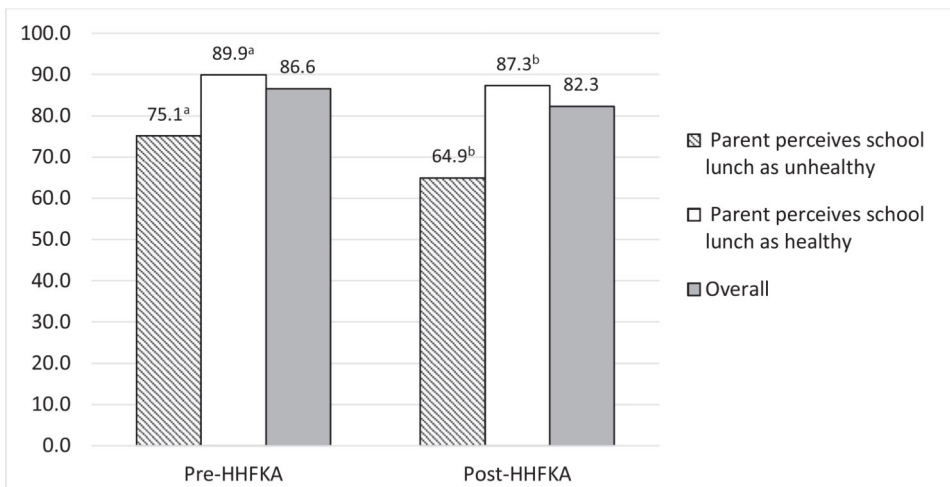


Figure. Adjusted school meal participation rates, pre- and post-Healthy Hunger-Free Kids Act (HHFKA). Overall and by parent perception of school meals. Participation rates were adjusted for age, sex, race/ethnicity, FRPM, mother’s education, parental perception of school meals, and the interaction between perception and time point based on model 3. Level of significance for differences in participation across all perception × time categories was determined using the lincom command in Stata. ^aParticipation pre-HHFKA was significantly higher for students whose parents rated school meals as healthy vs unhealthy ($P < 0.001$); ^bParticipation post-HHFKA was significantly higher for students whose parents rated school meals as healthy vs unhealthy ($P < 0.02$). Note: School meal participation rates did not change over time. In fact, participation rates pre and post-HHFKA were not significantly different for i) all children (86.6% vs 82.3%); ii) children of parents who rated meals as unhealthy (75.1% vs 64.9%); or iii) children of parents who rated meals as healthy (89.9% vs 87.3%).

Table 1. Descriptive Characteristics of Students in the Analytical Sample in the New Jersey Child Health Study (n = 1,351)

Sample Characteristics	Pre-HHFKA (n = 1,027)	Post-HHFKA (n = 324)	P Value
Sex			
Male	50.9	52.7	0.76
Female	49.1	47.3	
Race/Ethnicity			
Non-Hispanic White/other	13.4	14.1	0.49
Non-Hispanic Black	45.3	51.6	
Hispanic	41.3	34.3	
Age, years			
7–11	52.6	42.6	0.09
12–18	47.4	57.4	
Mother's education			
Less than high school	19.7	12.4	0.10
High school or equivalent	42.5	39.1	
Some college	38.8	48.5	
Eligible for free or reduced-price meal at school			
No	30.8	30.3	0.94
Yes	69.2	69.7	
Student eats lunch at school			
No	13.4	17.5	0.32
Yes	86.6	82.5	
Parents perception of school meals			
Unhealthy	22.2	19.8	0.61
Healthy	77.8	80.2	

HHFKA indicates Healthy Hunger-Free Kids Act.

Note: Values are presented as a percentage.

Table 2. Association Between Parental Perceptions of School Meals and Timing of HHFKA in the New Jersey Child Health Study (n = 1,351)

Independent Variables	Odds Ratio	95% CI	P Value
Time			
Pre-HHFKA	Reference		
Post-HHFKA	1.15	0.67–2.00	0.61
Gender			
Male	Reference		
Female	0.93	0.64–1.36	0.71
Race/ethnicity			
Non-Hispanic White/other	Reference		
Non-Hispanic Black	1.48	0.82–2.68	0.20
Hispanic	0.70	0.41–1.20	0.20
Age, years			
7–11	Reference		
12–18	0.64	0.44–0.93	0.02
Mother’s education			
Less than high school	Reference		
High school or equivalent	1.25	0.73–2.12	0.42
Some college	1.11	0.66–1.87	0.70
Eligible for free or reduced-price meal at school			
No	Reference		
Yes	1.16	0.76–1.77	0.49

CI indicates confidence interval; HHFKA, Healthy Hunger-Free Kids Act.

Note: Results are from a logistic regression analysis with parent perception as the outcome variable, coded as 0 for unhealthy and 1 for healthy.

Table 3. Association Between Parental Perception of School Meals with Student Participation in School Meals in the New Jersey Child Health Study (n = 1,351)

Independent Variables	Model 1 ^a			Model 2 ^b			Model 3 ^c		
	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value
Time									
Pre-HHFKA	Reference								
Post-HHFKA	0.72	0.37–1.40	0.33	0.68	0.35–1.30	0.24	0.55	0.20–1.50	0.24
Gender									
Male	Reference								
Female	0.92	0.55–1.56	0.76	0.93	0.55–1.57	0.78	0.93	0.55–1.57	0.78
Race									
Non-Hispanic White/other	Reference								
Non-Hispanic Black	2.34	1.19–4.58	0.01	2.35	1.19–4.63	0.01	2.40	1.24–4.64	0.01
Hispanic	1.88	0.99–3.56	0.05	2.00	1.06–3.78	0.03	2.02	1.07–3.81	0.03
Age, years									
7–11	Reference								
12–18	0.88	0.51–1.52	0.64	0.98	0.55–1.74	0.93	0.99	0.55–1.76	0.96
Mother's education									
Less than high school	Reference								
High school or equivalent	0.84	0.34–2.07	0.70	0.79	0.33–1.89	0.59	0.79	0.33–1.88	0.59
Some college	0.84	0.36–1.93	0.68	0.80	0.36–1.79	0.59	0.80	0.36–1.79	0.59
Eligible for free or reduced-price meal at school									
No	Reference								
Yes	5.01	2.94–8.53	<0.001	5.31	3.07–9.17	<0.001	5.30	3.07–9.16	<0.001
Parents perception of school meals									
Unhealthy	Reference								
Healthy	–	–	–	3.76	2.21–6.40	<0.001	3.48	1.96–6.18	<0.001
Perception × time point	–	–	–	–	–	–	1.35	0.38–4.86	0.65

CI indicates confidence interval; HHFKA, Healthy Hunger-Free Kids Act.

^aLogistic regression of participation in school meals adjusting for demographic and socioeconomic characteristics

^bModel 1 plus parental perception of school meals

Model 2 plus the interaction term between parental perceptions and time point.

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