

Calorie and Nutrient Profile of Combination Meals at U.S. Fast Food and Fast Casual Restaurants



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Introduction: The nutrient profile of combination meals in large chain restaurants is not well understood.

Methods: Combination meals from 34 U.S. fast food and fast casual restaurants (lunch/dinner, $n=1,113$; breakfast, $n=366$) were identified from online menus in 2017–2018 and corresponding nutrition information for each menu item was obtained from a restaurant nutrition database (MenuStat). Three options for each combination meal were analyzed: (1) default (as advertised on menu), (2) minimum (low-calorie option), and (3) maximum (high-calorie option). In 2018, meal nutrient composition was compared with the Healthier Restaurant Meal Guidelines, and linear models examined to what extent each meal component (entrée, side, beverage) drove differences in nutrients across meal options.

Results: There was substantial variation across the default, minimum, and maximum options of lunch/dinner combination meals for calories (default: 1,193 kilocalories; minimum: 767 kilocalories; maximum: 1,685 kilocalories), saturated fat (14 g, 11 g, 19 g), sodium (2,110 mg, 1,783 mg, 2,823 mg), and sugar (68 g, 10 g, 117 g). Most default meals exceeded the Healthier Restaurant Meal Guidelines for calories (97%) and sodium (99%); fewer exceeded the standards for saturated fat (50%) and total sugar (6%). Comparing the maximum and default lunch/dinner combination meals, beverages were the largest driver of differences in calories (178 kilocalories, 36% of difference) and sugar (46 g, 93% of difference), and entrées were the largest driver of differences in saturated fat (3 g, 59% of difference) and sodium (371 g, 52% of difference). Results were similar for breakfast meals.

Conclusions: Combination meals offered by large U.S. chain restaurants are high in calories, sodium, saturated fat, and sugar, with most default meals exceeding recommended limits for calories and sodium.

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INTRODUCTION

Restaurants play a large role in the U.S. diet, with more than one-third of adults eating at fast food restaurants each day¹ and the average American spending more than half of their food dollars away from home.² Prior research suggests that consuming food away from home, particularly fast food, increases daily caloric intake and reduces diet quality, as restaurant items typically contain high levels of sodium, saturated fat, and sugar, and offer limited fruit, vegetable, and whole grain options.^{3–6} Additionally, there is evidence

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linking consumption of food away from home to negative health outcomes such as weight gain and insulin resistance among adults.^{4,6,7}

Although previous studies have examined the nutrient content of individual menu items at large chain restaurants,^{8–15} key gaps exist in characterizing the nutrient profile of combination meals, a common menu offering that involves the bundling of an entrée, side, and beverage at a discounted price.¹⁶ Combination meals are a staple of fast food and fast casual chain restaurant menus and are widely purchased by consumers, with one study estimating that they represent 31% of all purchases at three major burger chains in the U.S. (McDonald's, Burger King, and Wendy's).¹⁷ Evidence from market research reports also suggests that combination meals in major U.S. burger chains have risen in popularity in recent years. From the year ending February 2015 to the year ending February 2016, the number of lunch and dinner combination meals ordered increased by 110 million, resulting in a total of 686 million orders.¹⁸ Marketing research suggests that combination meals increase the perceived value of bundled items, encouraging individuals to purchase items they may not have ordered individually.^{19,20}

Describing the caloric and nutrient content of combination meals (instead of individual menu items) is a critical piece of missing knowledge because it may be more consistent with the restaurant purchasing patterns of many Americans. Also absent from the current evidence base is an understanding of the range of calories and nutrients in combination meals after common consumer additions (e.g., mayonnaise), substitutions (e.g., replacing a sugary beverage with a zero-calorie alternative), or changes in the portion size (e.g., upsizing from a medium to a large order of fries). Examining to what extent components of a meal (entrée, side, or beverage) drive these ranges in calories and nutrients could help identify changes to industry practices or regulatory policies that could improve the healthfulness of combination meals. For example, if beverages are the primary driver of high sugar content in combination meals, voluntary industry actions or government policies could spur restaurants to offer a smaller size or a zero/lower-calorie beverage as the default option.

This study compares the calorie and nutrient content (grams of saturated fat, milligrams of sodium, and grams of sugar) of combination meals at large U.S. chain restaurants characterized in three ways: (1) default (as advertised on menu), (2) minimum (low-calorie option), and (3) maximum (high-calorie option). This study also examines to what extent each meal component drives differences in calorie and nutrient values across meal options (default, minimum, maximum). Finally, this

study assesses how each combination meal option compares to the Healthier Restaurant Meal Guidelines—restaurant meal standards based on the 2010–2015 Dietary Guidelines for Americans.²¹

METHODS

The authors constructed a database of restaurant combination meal options and linked each meal to nutrition information at the item level. Restaurants eligible for inclusion in the study were those included in MenuStat (www.menustat.org). MenuStat contains nutrition information from the top-grossing restaurant chains in the U.S.; details on the data collection methods are reported elsewhere.²²

Study Sample

In 2017, the MenuStat database included 93 restaurants. As MenuStat includes nutritional information for individual menu items and does not identify combination meals comprehensively, it was necessary to use online restaurant menus to determine which restaurants offered combination meals in 2017. Restaurants were excluded if they were full service ($n=28$); if they did not offer combination meals (e.g., only à la carte items, $n=16$); if their combination meals did not include an entrée, a side, and a beverage (e.g., only offered entrée and side, $n=6$); or if the combination meals did not advertise a default option (i.e., only offered build-your-own or fully customizable meals, $n=9$). Of the 59 excluded restaurants, 18 were fast food, 13 were fast casual, and 28 were full service. The final sample included 34 restaurants (31 fast food restaurants and three fast casual restaurants).

Measures

The authors defined default combination meals as at least one entrée, beverage, and side, as advertised on restaurant menus. For each default combination meal, a minimum (low-calorie) and maximum (high-calorie) option was constructed to reflect realistic modifications that would change the calorie content of a given combination meal. These options included reasonable add-ons or removals of toppings/dipping sauces to entrées or sides (e.g., mayonnaise), substitutions of sides or beverages with higher- or lower-calorie options (e.g., replacing fried potatoes with green beans or a sugary beverage with a zero-calorie alternative), or changes in the portion size of any meal component (e.g., upsizing from a medium to a large order of fries). A coding protocol was created to ensure consistency in constructing the combination meal options across all restaurants ([Appendix A](#), available online). [Table 1](#) illustrates the default, minimum, and maximum options of a chicken nugget combination meal from Jack in the Box.

A total of 1,113 lunch/dinner and 366 breakfast combination meals were identified. Each meal component within a given combination meal was matched with its unique item ID in MenuStat. This allowed for item-level linkage between the combination meals database (created by authors) and the nutrition information database (MenuStat, 2017). Total calorie and nutrient values for each combination meal were created by summing values of each component. If a menu item was missing nutrient values in 2017, nutrient values from the 2016 version of MenuStat were used. If the nutrient value was missing from the MenuStat database in both 2016 and 2017 versions, nutrition information from individual restaurants websites

Table 1. Example of Building Combination Meal Versions: Jack in the Box Chicken Nugget Combination Meal

Combination	Entrée (kcal)	Side (kcal)	Beverage ^a (kcal)	Total calories, kcal
Default	10 chicken nuggets (477) 1 honey mustard dipping sauce (60)	Fries, small size (300) 1 ketchup package (10)	Regular Coke, small size (200)	1,047
Minimum	10 chicken nuggets (477) 1 BBQ dipping sauce (40)	Fries, small size (300)	Diet Coke, small size (0)	817
Maximum	10 chicken nuggets (477) 2 Buttermilk house dipping sauces (220)	Fries, large size (550) 2 ketchup packages (20)	Hi-C Orange, large size (600)	1,867

Note: The default version of a Jack in the Box chicken nugget combination advertised on the restaurant website consisted of ten chicken nuggets with honey mustard dipping sauce, small fries with ketchup, and a small sugary drink. To create the minimum version of this combination, the honey mustard dipping sauce was replaced with a lower-calorie BBQ dipping sauce, the ketchup was removed from the side of fries, and the sugary drink was replaced with a diet beverage. To create the maximum version of this combination, the small fries were replaced with large fries, the one honey mustard dipping sauce was replaced with two higher-calorie Buttermilk house dipping sauces, an extra ketchup was added to the side, and the small sugary drink was replaced with a large sugary drink.

^aFor lunch/dinner combinations in all restaurants, the default beverage was always a regular Coke/Pepsi, the minimum beverage was always a diet Coke/Pepsi, and the maximum beverage was always the highest-calorie sugar-sweetened beverage available. [Appendix A](#) (available online) provides more details.

kcal, kilocalorie.

(collected by the authors in 2018) were used. After adding the missing data using these two methods, no meals were missing calorie or sodium information, 33 lunch/dinner meals were missing information about saturated fat (3.0% of the sample: 11 default, 11 maximum, and 11 minimum), and 13 lunch/dinner meals were missing sugar (1.2% of the sample: five default, four maximum, and four minimum). These meals were excluded from saturated fat ($n=33$) and sugar ($n=13$) analyses but included in calorie and sodium analyses. For the breakfast combination meals, there were complete data for all nutrients.

Statistical Analysis

Data were analyzed in 2018 using SAS, version 9.4, and Stata, version 15.1. All analyses were conducted separately for breakfast and lunch/dinner combination meals. Descriptive statistics (mean, SD, range) were used to summarize nutrient values (kilocalorie [kcal], saturated fat [g], total sugar [g], and sodium [mg]) for the default, minimum, and maximum options for each combination meal. Bootstrapped linear models with fixed effects for restaurant and meal component were used to examine to what extent each meal component (entrée, side [s], or beverage) drove differences in nutrient values for (1) maximum versus default combination meals and (2) minimum versus default combination meals. In these models, the unit of observation was the item in the combination meal. The primary outcome was the difference in the nutrient value of interest between the default and the minimum or maximum. The primary predictor was an indicator for meal component. Bootstrapping (with 50 replications) was used to account for the non-normality of residuals, and fixed effects for restaurant chain were used to account for clustering of menu items within restaurants.²³ After regression, Stata's margins command was used to estimate the predicted mean difference in nutrients between the default and minimum or the default and maximum for each meal component type.

The proportion of each combination meal type (default, minimum, maximum) that exceeded the Healthier Restaurant Meal Guidelines' nutrient standards for calories, saturated fat, sodium, and total sugar were summarized using descriptive statistics. The Healthier Restaurant Meal Guidelines, developed in 2012 by a group of

experts convened by the RAND Corporation, were chosen because they include standards for a full meal and all four nutrients included in this analysis.²¹ The guidelines have the following meal criteria: (1) ≤ 700 kcal, (2) $\leq 10\%$ calories from saturated fat, (3) ≤ 770 mg of sodium, and (4) $\leq 35\%$ of kcal from total sugars.²¹ Meals with a nutrient value at or below the upper limit were classified as meeting each guideline, and meals with a nutrient value above the upper limit were classified as exceeding each guideline.

RESULTS

Nutrient content varied significantly ($p < 0.05$ for all) across the default, minimum, and maximum lunch/dinner combination meals for calories (default, 1,193 kcal; minimum, 767 kcal; maximum, 1,685 kcal), saturated fat (14 g, 11 g, 19 g), sodium (2,110 mg, 1,783 mg, 2,823 mg), and sugar (68 g, 10 g, 117 g; [Table 2](#)). Similar patterns emerged among breakfast combination meals for calories (default, 771 kcal; minimum, 721 kcal; maximum, 1,091 kcal), saturated fat (15 g, 14 g, 17 g), sodium (1,827 mg, 1,703 mg, 2,104 mg), and sugar (7 g, 6 g, 43 g), although not all differences were significant.

[Figure 1](#) displays differences in mean calories, saturated fat (g), sodium (mg), and sugar (g) for default combination meals compared with the maximum and minimum options. Beverages were the largest driver of calorie differences between the maximum and default lunch/dinner combinations (+178 kcal, 36% of difference). This was followed by entrées (+168 kcal, 34% of difference) and sides (+147 kcal, 30% of difference). Similar patterns were observed between minimum and default lunch/dinner combinations. Absolute differences in calories among meal options were smaller for breakfast combination meals than for lunch/dinner combination meals. Beverages were the largest contributor to the calorie difference between the maximum and default

Table 2. Mean (SD) and Range of Nutrients in Default, Minimum, and Maximum Combination Meals

Combination meal versions	Default lunch/ dinner ^a breakfast ^b		Minimum lunch/ dinner ^a breakfast ^b		Maximum lunch/ dinner ^a breakfast ^b	
	Mean (SD)	Range	Mean (SD)	Range	Mean (SD)	Range
Lunch/dinner combination (n=1,113 ^c)						
Calories (kcal)	1,193 (287)	540–2,260	767 (264)	265–1,680	1,685 (419)	680–3,150
Saturated fat (g)	14 (7)	1–51	11 (7)	1–50	19 (8)	4–59
Sodium (mg)	2,110 (859)	495–6,280	1,783 (751)	305–4,510	2,823 (1,164)	800–9,935
Sugar (g)	68 (18)	2–109	10 (7)	0–81	117 (35)	34–191
Breakfast combination (n=366 ^c)						
Calories (kcal)	771 (217)	340–2,100	721 (221)	190–2,090	1,091 (291)	495–2,230
Saturated fat (g)	15 (6)	1–53	14 (6)	0–53	17 (6)	1–53
Sodium (mg)	1,827 (788)	65–8,810	1,703 (800)	50–8,710	2,104 (890)	60–8,940
Sugar (g)	7 (7)	1–47	6 (6)	1–44	43 (17)	2–85

Note: Boldface indicates statistically significant difference ($p < 0.05$) in minimum or maximum nutrient value compared with default nutrient value in bootstrapped linear model with fixed effects for each restaurant and combination meal type. Because of missing nutrient values for saturated fat and sugar, sample size for some analyses was smaller than the total number of combinations. Lunch/Dinner combinations: default saturated fat, $n=360$; default sugar, $n=366$; minimum saturated fat, $n=360$; minimum sugar, $n=367$; maximum saturated fat, $n=360$; maximum sugar, $n=367$.

^a $n=371$.

^b $n=122$.

^cTotal combinations.

kcal, kilocalorie.

breakfast combination meals (+156 kcal, 49% of difference). Entrées contributed most to the difference between minimum and default breakfast combination meals (–35 kcal, 70% of difference).

Entrées in lunch/dinner combination meals were the greatest contributor to the differences in saturated fat between the maximum and default (+3.0 g, 59% of difference) and the minimum and default (–2.2 g, 64% of difference). Sides in breakfast combination meals contributed the most to the difference in saturated fat between the maximum and default (+1.5 g, 69% of difference), whereas entrées were the largest driver of differences between the minimum and default (–1.1 g, 91% of difference). For sodium, entrées in lunch/dinner combinations were the largest driver of differences between the maximum and default (+371 mg, 52% of difference) and the minimum and default (–216 mg, 66% of difference). Sides in breakfast combinations were the biggest contributors to differences in sodium between the maximum and default (+250 mg, 90% of difference) and the minimum and default (–77 mg, 62% of difference). For sugar, beverages contributed the most to the difference between the maximum and default for both lunch/dinner (+46 g, 93% of difference) and breakfast (+33 g, 93% of difference), and the difference between the minimum and default for lunch/dinner (–57 g, 98% of difference). Point estimates and 95% CIs for all models are reported in [Appendix Table 4](#) (available online).

Figure 2 displays the proportion of combination meals exceeding the Healthier Restaurant Meal Guidelines for each nutrient. Of note, nearly all combinations exceeded

the sodium recommendation for lunch/dinner (default, 99%; minimum, 96%; maximum, 100%) and breakfast (default, 99%; minimum, 99%; maximum, 99%). All maximum lunch/dinner combination meals (100%) and most default lunch/dinner combination meals (97%) exceeded the calorie recommendation, and a smaller proportion of minimum combination meals (58%) exceeded this standard. Most breakfast combination meals exceeded the saturated fat guidelines for breakfast (default, 94%; minimum, 89%; maximum, 90%); about half of lunch/dinner combination meals also exceeded this guideline (default, 49%; minimum, 54%; maximum, 46%). Few combination meals exceeded the total sugar guideline for both breakfast (default, 0%; minimum, 0%; maximum, 3%) and lunch/dinner (default, 6%; minimum, 0%; maximum, 20%). Only one default combination meal and six minimum combination meals met the recommendations for all four nutrients.

DISCUSSION

Combination meals offered by large U.S. chain restaurants are high in calories, saturated fat, sodium, and sugar, with nearly all default meals exceeding the Healthier Restaurant Meal Guidelines for calories and sodium. Consumer additions and substitutions to default combination meals result in substantial changes to the overall calorie and nutrient content of a given meal. For example, additions (e.g., increasing sugary beverage size, ordering extra dipping sauces) result in maximum lunch/dinner combination meals that

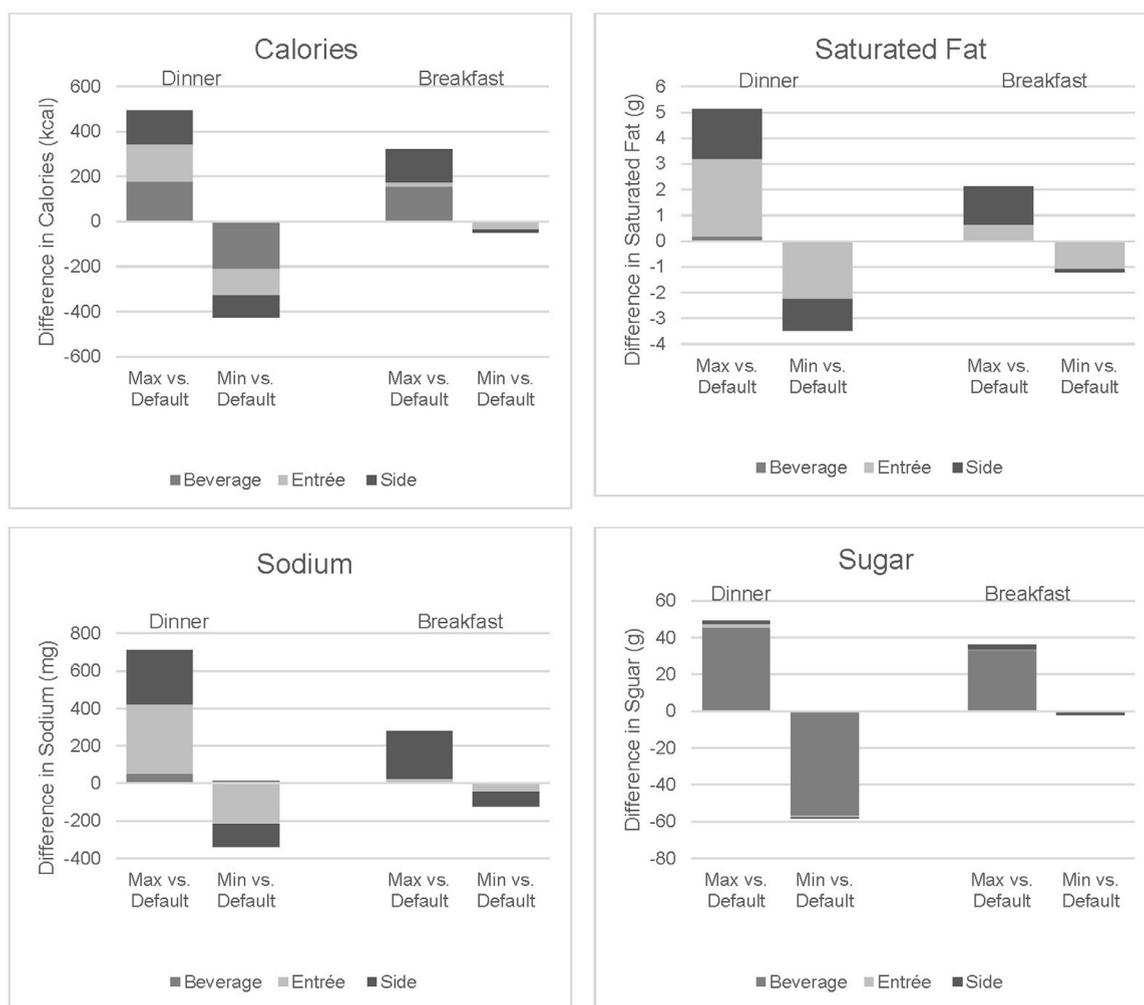


Figure 1. Differences in Mean Nutrient Values for Default Versus Maximum and Minimum, by Meal Component.

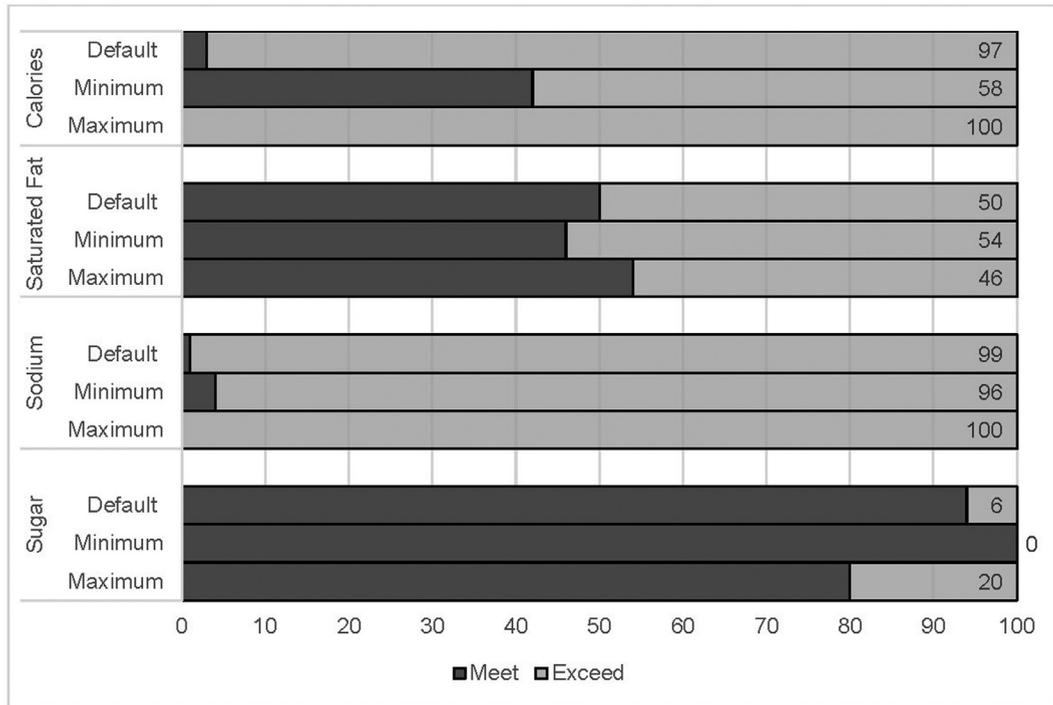
Changes to meal components included add-ons or removals of toppings/condiments for entrées or sides (e.g., mayonnaise), substitutions of sides or beverages (e.g., replacing a sugary beverage with a zero-calorie alternative), or changes in the portion size of any meal component (e.g., upsizing from a medium to a large order of fries).

contain, on average, 492 more kcal, 5 g more saturated fat, 713 mg more sodium, and 49 g more sugar than default combination meals. By contrast, substitutions (e.g., replacing a sugary drink with a zero-calorie option, removing high-calorie toppings) result in minimum lunch/dinner combination meals that contain, on average, 426 fewer kcal, 3 g less saturated fat, 327 mg less sodium, and 58 g less sugar than the default combination meal. In both breakfast and lunch/dinner combination meals, beverages were the largest driver of increases in calories and sugar, whereas entrées and sides were the largest drivers of increases in saturated fat and sodium.

The findings of this study indicate that there is room to improve the healthfulness of restaurant combination meals, with only one default meal in the sample meeting the Healthier Restaurant Meal Guidelines standards for all four nutrients. This study highlights several ways that

customers can eliminate excess calories, saturated fat, sugar, and sodium from the diet. For example, replacing sugary beverages with a zero-calorie alternative is an effective way to reduce calories and sugar, and removing toppings and dipping sauces from entrées is an effective way to reduce saturated fat and sodium. Consumer behavior could be modified through large-scale public health campaigns that are supported by research demonstrating the importance of simple, specific messages for changing consumer behaviors.²⁴ For example, prior research suggests that simply inviting customers to downsize fast food portions may be effective in reducing calorie consumption.²⁵ Public health campaigns could be leveraged by municipalities or restaurants to bolster the effects of the national menu labeling law,²⁶ which requires chain restaurants to post calories on their menus but allows great flexibility in providing

Lunch/Dinner



Breakfast

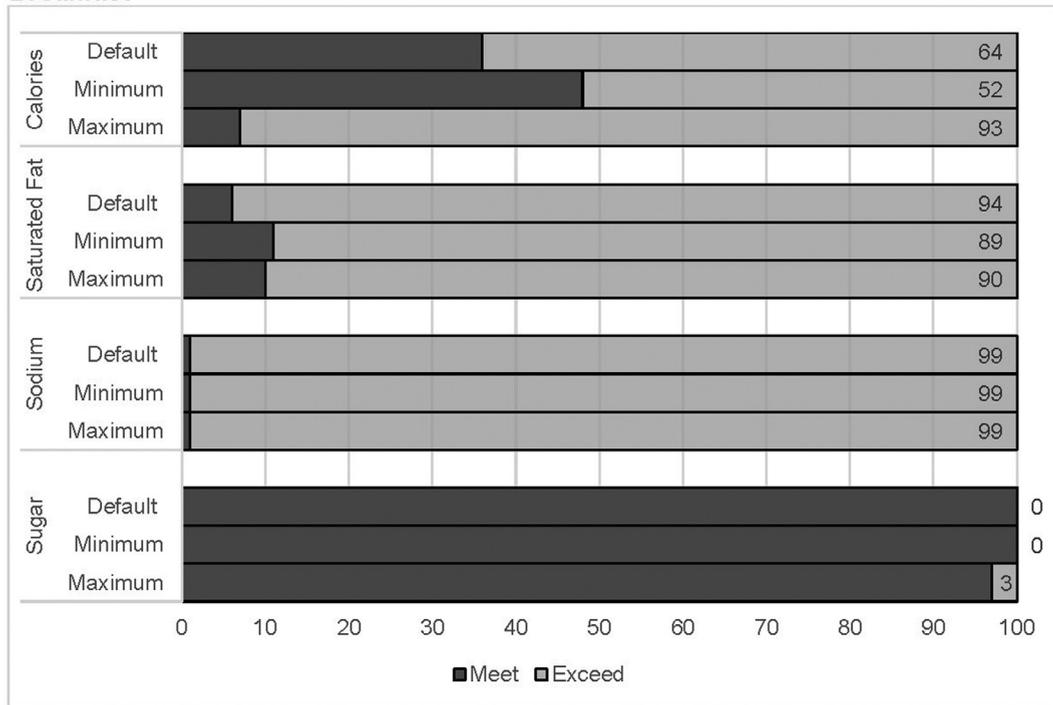


Figure 2. Proportion of Combination Meals Meeting and Exceeding Nutrient Standards for Calories, Saturated Fat, Sodium, and Sugar.

Number on figure represents proportion within each combination meal category exceeding recommended limit. Nutrient standards based on the Healthier Restaurant Meal Guidelines: (1) ≤ 700 calories, (2) $\leq 10\%$ of calories from saturated fat, (3) ≤ 770 mg of sodium, and (4) $\leq 35\%$ of calories from total sugars.

information about combination meals. Providing consumers with clear, action-oriented messages about how to modify their combination meals may improve food and beverage choices, and the increased transparency could catalyze voluntary restaurant reformulation toward healthier products.

Changes to restaurant offerings—actions that do not rely on individual behavior change—are important for enhancing population impact. A governmental policy that regulates what restaurants serve is one such approach. For example, some local laws now require restaurants to offer only healthy beverages (e.g., water, unflavored milk) instead of sugary drinks as the default beverage with children's meals (e.g., California's Healthy by Default Kids' Meal Drinks law²⁷). These policies leverage the tendency of consumers to stick with the status quo,^{28,29} while still providing choice, and have been effective at modifying behavior across a host of areas, such as organ donation and retirement planning.^{30,31} Such policies could be extended to include all combination meals, or could be amended to set portion limits for default beverages (one-third of restaurants in this study provided a "medium" or "regular" beverage size as the default, with an average of 20 ounces and 215 kcal per serving). Another approach could be reducing the cost incentive of upsizing from a default to a maximum combination meal, or to provide combination meals that meet nutrient standards at a similar or competitive price to default combination meals.

Although the literature on combination meals is limited, the findings of this study are consistent with other studies' conclusions that large chain restaurant offerings are generally unhealthy.^{8,32–34} Future research collecting sales and consumption data is needed to identify how frequently customers order combination meals (versus individual items off the à la carte menu), the types of customizations individuals most often make (e.g., additions and substitutions), and the contribution of combination meals to overall dietary intake. Additionally, there is a need for research evaluating the effectiveness of potential policy changes (e.g., portion limits) on the healthfulness of restaurant offerings and consumer choice. This research should consider the broad range of impacts that changing restaurant policy may have, including environmental (e.g., if offering plastic water bottles as the default beverage), health (e.g., if encouraging changes to lower-calorie, artificially sweetened beverages), and restaurant profits (e.g., if reductions in portion size or offering water as the default beverage decreases the perceived value of meal). As menu labeling is now implemented widely in large chain restaurants in the U.S., research is also needed to evaluate the effectiveness of posting ranges of calories for combinations meals.

Limitations

This study has several limitations. First, the maximum and minimum combination meal options were created to result in high- and low-calorie meal options. This means that values for other nutrients may have had different summary statistics if the meal combinations had been built to maximize or minimize other nutrient values instead. Additionally, because creating realistic maximum and minimum combination meals was a priority, the sample may not have captured the highest-calorie options of these combination meals (e.g., a maximum option that substituted a milk shake for a soda). Second, this analysis only included three combination meal options; examining the distribution of nutrient values for all possible permutations of a given combination meal would be informative but it was beyond the scope of this analysis. Third, because this analysis lacked sales and consumption data, it is not known which combination meal option consumers tend to purchase, and therefore inferences about the impact of study findings on health outcomes are limited. Fourth, this analysis included 34 large chain restaurants in the U.S.; thus, the findings may not be generalizable to other types of restaurants (e.g., small chains or independent restaurants). Moreover, because the restaurants in the study sample were predominantly fast food restaurants, the findings may not be generalizable to fast casual restaurants. Fifth, the Healthier Restaurant Meal Guidelines for saturated fat and total sugar are based on limiting the percentage of calories coming from these nutrients. Because the calories in combination meals are so high, this sets an extremely high threshold for saturated fat and sugar. Despite these limitations, this study also has several strengths, including the use of a high-quality nutrient database and the creation and application of a detailed codebook to create a novel combination meal database.

CONCLUSIONS

Combination meals are high in calories, saturated fat, sodium, and sugar, with most default meals exceeding the recommended levels of calories and sodium suggested by the Healthier Restaurant Meal Guidelines. Industry and governmental policies that improve the nutritional profile of default combination meals are promising strategies for improving dietary behaviors in restaurants.

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SUPPLEMENTAL MATERIAL

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