

INTERVENTION TABLE 5

Menu Labeling

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
United States						
Harnack, French (2008) Minnesota	<p>Menu labels added (calorie information) and removed (value pricing) at McDonald's</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i></p> <ol style="list-style-type: none"> Elimination of value size pricing (per unit cost decreases as portion size increases) and use of standardized prices (price per ounce standardized across portions size options) <p><i>Complex:</i> Not reported</p>	<p>DESIGN: Randomized trial</p> <p>DURATION: 7 months</p> <p>SAMPLE SIZE: 594 adults and adolescents</p> <p>PRIMARY OUTCOME: Dietary consumption</p> <p>MEASURES:</p> <ol style="list-style-type: none"> Nutrient composition using the McDonald's food composition table in combination with the gram weight information for the amount selected and consumed. Estimates for kcal, total fat, total carbohydrate, total protein, saturated fat, dietary fiber, vitamin C and calcium were generated. Survey (fast food frequency, opinions about fast food and food shopping and preparation practices) Interviews (nutrition knowledge and beliefs and self-reported height and weight) <p>DATA COLLECTION: Phone calls and flyers were used to recruit participants (schools for adolescents). Four paper menus were developed by the research team (format of McDonald's menu boards, October 2005). Participants were blinded to the meal source (descriptions modified): 1. Calorie menu: calories for each menu item; 2. Price menu: modified so that the value size pricing structure (by portion size) was eliminated; prices listed were calculated so that the price per ounce was standardized across options; 3. Calorie plus pricing: calories listed with price modifications; 4. Control menu: no calories and usual McDonald's pricing. Data were collected while waiting for food to be ordered.</p> <p>LIMITATIONS: One-time exposure to conditions, while repeated exposure to calories and standardized pricing may be required; study did not take place in a restaurant; incentive may have undermined price sensitivity</p>	<p>Adults</p> <p>16-18 year olds</p> <p>~25% racial/ethnic populations (evaluation sample)</p> <p>ELIGIBILITY: Participants were eligible if they were >16 years old, ate at fast food restaurants > 1 time/week, were able to speak and read English, were willing to participate in a two hour study session requiring purchase of a fast food restaurant meal for dinner and had a complete survey and interview.</p> <p>Eleven people were excluded since they knew menus might be modified and they would not have to pay for the food ordered.</p> <p>EXPOSURE/PARTICIPATION: Not reported</p>	<p>LEAD AGENCY: Research team</p> <p>THEORY/FRAMEWORK: Not reported</p> <p>ADOPTION: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>IMPLEMENTATION: Adolescents and adults were asked to purchase and consume a fast food restaurant meal from one of four randomly assigned menus. Menu varied as to whether calorie information was provided and value size pricing was used.</p> <p>Intervention took place in study sites (conference rooms and church), not in actual restaurants. Food was ordered and delivered to participants at study site.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> Incentives (\$25 gift card) Ads Personnel to distribute menus and pick up food Funds for the meals ordered Car to pick up the meals Menus Conference room and basement in church <p>FUNDING: National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)</p> <p>STRATEGIES: Not applicable – efficacy trial</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> No significant differences ($p=0.25$) in the average number of calories consumed by those in the calorie, price, calorie plus price, and control menu conditions (805, 813, 761 and 739 respectively). Selection and consumption of major food categories and portion sizes did not differ by condition. Average energy intake was higher among males in the calorie, price and calorie plus price conditions compared to controls ($p=0.01$). Among those who reported that nutrition was important when buying food from a fast food restaurant, average energy intake was significantly lower among those who received the control and calorie plus price menus relative to those that reported nutrition was not important ($p<0.01$). Among those who reported price was not important when buying food from a fast food restaurant, average energy intake was lowest among those in the control condition (598 kcal) and highest among those in the calorie plus price condition (948 kcal, $p=0.01$). Multivariate regression indicated that average energy intake was comparable between those who reported noticing the calorie information and those who did not (690 kcal versus 671 kcal; $p=0.65$).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Yamamoto, Yamamoto (2005) United States	<p>Menu labels (calorie and fat content) in McDonald's, Denny's and Panda express</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported Complex: Not reported</p>	<p>DESIGN: Before and after study DURATION: < 6 months SAMPLE SIZE: 106 adolescents PRIMARY OUTCOME: Dietary consumption</p> <p>MEASURES: 1. Estimates of consumption before and after menu modification - calorie/fat contents and cost were calculated for each meal ordered for each individual. The 106 participants ordered/recorded 318 meals before the menu modifications and 318 meals after the menu modifications. 2. Questionnaires (age, height, weight, and how they perceive themselves - too fat, slightly overweight, just right, slightly overweight, or too skinny)</p> <p>DATA COLLECTION: Three restaurant chains were selected to be represented in the study: McDonald's (fast food restaurant), Denny's (sit-down restaurant), and Panda Express (in-between-type restaurant). Each participant was asked to hypothetically order a meal from each of the restaurants' menus and estimate how much of the item they would actually consume. After menus were modified, participants were asked to hypothetically order a meal from each restaurant menu and estimate how much of the item they would actually consume.</p> <p>LIMITATIONS: Convenience sample may lead to selection bias</p>	<p>11-18 year olds</p> <p>ELIGIBILITY: Adolescents aged 11 to 18 years; first 106 to enroll; required to obtain written parental informed consent and provide written informed assent. Participants were selected from a convenience sample of middle or high school band/ orchestra programs, high school varsity tennis programs or junior open tennis tournaments.</p> <p>EXPOSURE/ PARTICIPATION: Not reported</p>	<p>LEAD AGENCY: Research team</p> <p>THEORY/ FRAMEWORK: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: Menus were obtained from Denny's, and paper photographic image menus were created by the research team for McDonald's and Panda Express. The research team modified the menus to include calorie and fat content nutrition information listed next to each menu item.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: 1. Restaurant menus 2. Personnel to develop the menu labels 3. Nutritional information from the restaurants</p> <p>FUNDING: Not reported</p> <p>STRATEGIES: Not applicable- pilot study</p>	<p>FOOD PURCHASES/CONSUMPTION ESTIMATES: 1. The modified menus resulted in significantly lower calories ordered from McDonald's (933 ± 354 [standard menu] vs. 888 ± 385 [modified menu], $p=0.002$) and Panda Express (874 ± 301 vs. 837 ± 342, $p=0.005$), but not at Denny's. 2. The modified menus resulted in significantly lower amounts of fat ordered from McDonald's (40.3 ± 15.8 vs. 38.2 ± 16.9, $p=0.001$) and Panda Express (29.9 ± 14.6 vs. 28.3 ± 15.9, $p=0.004$), but not at Denny's. 3. Although calorie and fat reductions were statistically significant, the changes occurred in fewer than 20% of the subjects. 4. For the 31 adolescents who changed at least one of their orders (3 orders per subject, 93 orders total), 43 meals resulted in decreased calories and 11 meals resulted in increased calories (remaining 39 meals unchanged). 5. Of the 27 who rated themselves as too fat or slightly overweight, only 9 (32%) changed their orders after menu modification, and only 3 changed their orders for all 3 restaurants (16 meals changed to lower calories and one meal changed to higher calories). 6. Of the 8 who rated themselves as too skinny, only 2 changed their orders after menu modification (2 meals changed to higher calories and one meal changed to lower calories). 7. Of the 54 meals changed after the menu modification, 20 resulted in a more expensive meal, 23 resulted in a less expensive meal, and 11 resulted in no change. There was an average change of \$0.027 increase.</p>

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Bassett, Dumanovsky (2008) New York	<p>Menu labels with calorie information at fast-food chain restaurants</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported Complex: Not reported</p>	<p>DESIGN: Cross-sectional study</p> <p>DURATION: Not applicable</p> <p>SAMPLE SIZE: 11 licensed chain fast-food establishments (Department of Health and Mental Hygiene) providing calorie information on March 1, 2007; 7,318 fast-food patrons</p> <p>PRIMARY OUTCOME: Dietary consumption</p> <p>MEASURES:</p> <ol style="list-style-type: none"> Surveys (calorie information, food purchases, whether they menu labels) Receipts for caloric intake (calories adjusted for extras or customizations) <p>DATA COLLECTION: Surveys and receipts were collected from 12pm to 2pm on weekdays from March 27 through June 8, 2007; target was 50 receipts per site with each location visited once. Three-person teams counted all patrons entering the restaurant and approached patrons as they entered the restaurant to ask for their register receipts and to answer a brief questionnaire when exiting.</p> <p>LIMITATIONS: Representativeness of Subway restaurant patrons compared to other chain restaurants (e.g., Subway foods may be lower in calories, Subway patrons may be more likely to purchase foods with fewer calories); respondents may differ from non-respondents; provision of receipts seemed to vary by consumer traffic volume more than individual patron factors.</p>	<p>Adults</p> <p>ELIGIBILITY: Those 18 years or older entering or exiting the fast-food chain.</p> <p>(7750 receipts/surveys collected, 432 (5.6%) excluded as the purchase was for someone else, the receipt was from a non-sampled chain, or the receipt listed items with an undetermined caloric value.)</p> <p>EXPOSURE/PARTICIPATION: Not applicable</p>	<p>LEAD AGENCY: Restaurants and the research team</p> <p>THEORY/FRAMEWORK: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not applicable</p> <p>ADOPTION: Not applicable</p> <p>IMPLEMENTATION: Not applicable</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: Not applicable</p> <p>FUNDING: Not reported</p> <p>STRATEGIES: Not applicable</p>	<p>FOOD PURCHASES:</p> <ol style="list-style-type: none"> Subway patrons who reported seeing menu labels purchased 52 fewer calories than those who reported not seeing calorie information (mean calories: 714 vs. 766; $p < 0.01$), and fewer purchased high-calorie meals (17% vs. 23% purchased ≥ 1000 calories; $p < 0.01$; and 7% vs. 10% purchased ≥ 1250 calories; $p < 0.05$). 37% of Subway patrons who reported seeing menu labels also reported that this information had an effect on their purchases. Subway patrons who reported seeing and using calorie information purchased 99 fewer calories than those who reported seeing, not using the information (mean calories: 647 vs 746; $p < 0.001$), and lower-calorie meals (4% vs. 9% purchased ≥ 1250 calories; $p < 0.03$). No difference in mean calories purchased by patrons reporting seeing, not using calorie information and those not seeing calorie information (mean calories: 746 vs. 766; $p = 0.29$). <p>OTHER:</p> <ol style="list-style-type: none"> Excluding Subway patrons, only 4% of patrons reported seeing calorie information as currently provided. Subway patrons were much more likely to report seeing menu labels than patrons of other chains (32% vs. 4%, $p < .001$).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Harnack (2006) Minnesota	<p>Menu labels at major chain table-service restaurants</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported Complex: Not reported</p>	<p>DESIGN: Descriptive study DURATION: Not applicable SAMPLE SIZE: 15 table-service restaurants PRIMARY OUTCOME: Dietary consumption MEASURES: 1. Questionnaire (proportion of menu items including nutrient composition information, nutrient information provided, and whether nutrient composition information was only available for menu items with specific health or nutrient claims) DATA COLLECTION: Trained observers visited each restaurant during lunch or dinner service hours and completed an audit of major chain table-service restaurants on availability of nutrition information. Each restaurant's website was scanned to locate any nutrient composition information and reflected in the audits. If a website did not give any nutrient composition, an email was sent to determine if additional nutritional information was available and documented in the audit. LIMITATIONS: Limited study sample restricts generalizability of nutrition information practices of the entire table-service segment; restaurant observation was designed to evaluate the availability of nutrition composition information on the restaurant menu only; availability of nutrition information elsewhere in the restaurant was not evaluated.</p>	<p>ELIGIBILITY: The first 15 table-service restaurants obtained from the "Restaurants and Institutions" top 400 listing for 2003 were selected which met certain inclusion criteria (located in Minneapolis or a nearby suburb, family-oriented). When restaurants had more than one location listed in the Yellow Pages, one restaurant was randomly selected to be studied. If the Yellow Pages indicated three or more locations, a second restaurant was randomly selected to test for differences between restaurants within the same corporate chain. EXPOSURE/PARTICIPATION: Not applicable</p>	<p>LEAD AGENCY: Research team THEORY/FRAMEWORK: Not reported EVIDENCE-BASED: Not reported REPLICATION/ADAPTATION: Not applicable ADOPTION: Not applicable IMPLEMENTATION: Not applicable FORMATIVE EVALUATION: Not reported PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: Not applicable FUNDING: JB Hawley Student Research Award STRATEGIES: Not applicable</p>	<p>AVAILABILITY OF NUTRITION INFORMATION:</p> <ol style="list-style-type: none"> 10 of the 15 restaurants provided nutrient composition information on the standard menu. Of these, only 9 provided information for menu items with specific health claims like "heart-healthy" or "low fat." None of the restaurants provided nutrient composition information for more than half of the food items on their menu. Of those restaurants with a children's section on their main menu (n=4) or a separate children's menu (n=9), only 1 had any nutrient composition information available. Overall, 9 of the restaurants provided at least some nutrient composition information for menu items and 1 restaurant provided information for children's menu items. Of the 9 restaurants providing online information, 6 provided this information for an estimated "less than half" of menu items; 3 provided information for all menu items. 11 out of 12 restaurants which provided no information or information for less than half of the menu items online responded to an email inquiry to obtain nutrient information.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
Roberto, Agnew (2009) Connecticut & New York	<p>Menu labels (calories) in McDonald's, Burger King, Au Bon Pain and Starbucks restaurants (posters, pamphlets, website)</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i> Not reported <i>Complex:</i> Not reported</p>	<p>DESIGN: Descriptive study DURATION: Not reported SAMPLE SIZE: 4,311 observations reported PRIMARY OUTCOME: Dietary consumption MEASURES: Direct observation DATA COLLECTION: A research assistant blind to the study hypothesis conducted some observations. Observations were performed for 1.5 hour intervals during periods on a weekend and weekday from 8am to 10am, 11am to 1pm, and 5pm to 7pm. McDonald's and Burger King patrons were categorized as accessing nutrition information if they approached the poster on the wall and turned their head toward it (one did not have to face the poster to purchase food) or picked up a nutrition pamphlet (in the McDonald's only). Au Bon Pain patrons were categorized as accessing nutrition information when they touched the computer screen, thus turning it on. Starbuck's patrons were categorized as accessing nutrition information when they picked up a nutrition pamphlet. Researchers from the Department of Psychology and Yale University conducted the analysis. LIMITATIONS: Not reported</p>	<p>Urban & Suburban ELIGIBILITY: Patrons of McDonald's on Manhattan's Upper West Side, Burger King, Starbucks, and Au Bon Pain in New Haven, Connecticut; a McDonald's and a Burger King in a suburb of New Haven; and a Starbucks and Au Bon Pain located inside shopping malls in 2 different Connecticut suburbs. EXPOSURE/PARTICIPATION: All patrons who entered the intervention restaurants were potentially exposed to the menu labels.</p>	<p>LEAD AGENCY: Restaurants and the research team THEORY/FRAMEWORK: Not reported EVIDENCE-BASED: Not reported REPLICATION/ADAPTATION: Not reported ADOPTION: Not reported IMPLEMENTATION: Compliance was obtained from restaurants to post nutritional information: McDonald's and Burger King - wall poster McDonald's and Starbucks – nutrition pamphlets Au bon Pain - computer website FORMATIVE EVALUATION: Not reported PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: 1. Menu labels 2. Personnel to develop menu labels 3. Nutrition information from the restaurants FUNDING: Not reported STRATEGIES: Not reported</p>	<p>USE OF CALORIE INFORMATION: 1. Of the 1,501 people who entered the McDonald's outlets, 1 woman and 1 man (0.1%) were observed accessing nutrition information prior to purchasing food, and 1 woman and 1 man accessed the information after making their purchase. 2. Of the 482 people who entered the Burger Kings, only 2 men and 1 woman (0.6%) looked at the nutrition poster. 3. Of the 1,671 customers who entered the Au Bon Pains, 1 woman (0.06%) was observed accessing nutrition information. 4. None of the 657 people who entered Starbucks accessed information.</p>

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
International						
Stubenitsky, Aaron (2000) England/ United Kingdom	<p>Menu labels (nutrition information) on restaurant menus</p> <p>OTHER INTERVENTION COMPONENTS: <i>Multi-component:</i></p> <ol style="list-style-type: none"> 1. Chef modified the target dish so that it had lower energy and percent energy from fat than the original version <p><i>Complex:</i> Not reported</p>	<p>DESIGN: Non-randomized trial</p> <p>DURATION: 2 weeks</p> <p>SAMPLE SIZE: 279 restaurant patrons</p> <p>PRIMARY OUTCOME: Dietary consumption</p> <p>MEASURES: Baseline questionnaire -expectations of the meal they ordered (how they will like it; pleasantness of taste, texture, and appearance; how it will affect their health, and how hungry they were). Follow up questionnaire after meal with the same questions worded to relate to their actual perception of the meal (how well dish matched expectations, how likely it was that they would purchase the dish again). Final questionnaire on attitudes and beliefs toward eating healthy options in a catering environment, demographic characteristics, and their restrained eating behavior (restrained eating scale, Dutch Eating Behavior Questionnaire).</p> <p>DATA COLLECTION: A pilot sensory test trial occurred with 15 patrons to determine if the full-fat and reduced-fat dishes could be distinguished. Restaurant staff handed out three questionnaires to patrons, one before the meal and two after the meal. Patrons were assigned to one of four conditions:</p> <ol style="list-style-type: none"> 1. Full-fat blind (FFB) - full-fat target item with no additional information 2. Reduced-fat blind (RFB) - reduced-fat target item with no additional information 3. Reduced-fat informed (RFI) - reduced-fat target item labeled on menu 4. Reduced-fat informed with details (RFID) - reduced-fat target item labeled on menu with details on modified preparations <p>Patrons were unaware of the alternative printed versions of the menu or versions of the target dish.</p> <p>LIMITATIONS: Patrons tended to be older than the average; most were regular visitors of the restaurant, which may have affected their pre-meal expectations</p>	<p>Other than a somewhat older than average age, the socio-demographic characteristics of the intervention population were typical of the United Kingdom population as a whole.</p> <p>ELIGIBILITY: Patrons who made a booking for a meal at the restaurant during the weeks the study was held and read and signed a brief consent form prior to their meal.</p> <p>EXPOSURE/ PARTICIPATION: Not reported</p>	<p>LEAD AGENCY: The restaurant and the research team</p> <p>THEORY/ FRAMEWORK: Stages of Change model (thoughts about choosing a healthy option when eating out); Theory of Planned Behavior (attitudes and beliefs towards eating healthy options in a catering environment)</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: One main dish (smoked haddock with welsh rarebit) was selected to be the target item for the study. Two other main dishes (stir fry beef and vegetarian pasta alicia) were offered at the restaurant during the study.</p> <p>FORMATIVE EVALUATION: The research team conducted a pilot sensory test trial with 15 restaurant customers to determine if the full-fat and reduced-fat dishes could be distinguished from one another.</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES: 1. Recipe details for each food 2. Menus</p> <p>FUNDING: Commission of the European Communities as part of project FAIR, as well as the Bio-technology and Biological Sciences Research Council</p> <p>STRATEGIES: Not reported</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> 1. Among patrons choosing the target haddock dish, treatment condition only had a significant influence on total energy and grams of fat intake for the full-fat blind (FFB) group (F=5.27, p=0.002; F=13.82, p<0.001, respectively). This effect directly reflected the actual difference in energy and grams of fat between the full-fat and reduced-fat dish. 2. No significant influence of menu information on grams of fat and energy intake for subjects selecting the stir fry beef dish and the pasta dish. 3. The FFB group had the highest intake of grams of fat and energy of all treatment dish selection combinations. 4. Among the 3 groups receiving the reduced-fat dish, menu information had no effect on total energy and fat intake. <p>FOOD PURCHASES:</p> <ol style="list-style-type: none"> 5. The proportion of subjects choosing the haddock dish was not significantly higher when no information was presented (35% of subjects) versus when the reduced-fat version was identified (25% of subjects, p=0.151). 6. The proportion of subjects choosing the other main dishes (excluding the target dish) was not influenced by the presence of information on the menu (p>0.05). <p>OTHER:</p> <ol style="list-style-type: none"> 7. Subjects in stage 2 and 3 of behavioral change ('should choose' or 'usually try to eat a healthy option when eating out') had overall significantly higher post-meal liking ratings than those in stage 1 of behavioral change ('am not interested in choosing a healthy option when eating out'), and were more likely to purchase again [F(1,77)= 4.19, p=0.04; F(1,78)= 9.07, p=0.004, respectively]

REFERENCES

- Bassett, M.T., Dumanovsky, T., Huang, C., Silver, L.D., Young, C., Nonas, C., Matte, T.D., Chideya, S., and Frieden, T.R. (2008). Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *American Journal of Public Health*. 98(8): 1457-1459.
- Harnack, L.J. (2006). Availability of nutrition information on menus at major chain table-service restaurants. *Journal of the American Dietetic Association*. 106(7): 1012-1015.
- Harnack, L.J., French, S.A., Oakes, J.M., Story, M.T., Jeffery, R.W., and Rydell, S.A. (2008). Effects of calorie labeling and value size pricing on fast food meal choices: Results from an experimental trial. *International Journal of Behavioral Nutrition and Physical Activity*. 5(63).
- Roberto, C.A., Agnew, H., and Brownell, K.D. (2009). An observational study of consumers' accessing of nutrition information in chain restaurants. *American Journal of Public Health*. 99(5): 820-821.
- Stubenitsky, K., Aaron, J., Catt, S., and Mela, D. (2000). The influence of recipe modification and nutritional information on restaurant food acceptance and macronutrient intakes. *Public Health Nutrition*. 3(2): 201-209.
- Yamamoto, J.A., Yamamoto, J.B., Yamamoto, B.E., and Yamamoto, L.G. (2005). Adolescent fast food and restaurant ordering behavior with and without calorie and fat content menu information. *Journal of Adolescent Health*. 37(5): 397-402.