

The effect of subsidies on healthful consumption: Systematic review and data synthesis



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Background

- Prevalence of obesity and overweight have risen globally resulting in an unrestrained epidemic.
- Main contributing factor is thought to be a change in food-related consumer purchasing behavior.
- Health policy makers are seeking evidence-based approaches in an effort to alleviate the significant morbidity and mortality associated with obesity and overweight.

Objective

- This study focuses on reviewing and aggregating all available evidence on the subsidization of healthy foods as a fiscal tool to aid in the public health response to this epidemic.

Methodology

- A systematic search of the major international databases was conducted looking for studies on healthy food subsidies.
- Relevant studies were synthesized into a table reviewing study design, outcomes and measures, in addition to conclusions (Table 1 and Fig. 1).
- Key messages and overall trends were examined and presented, along with an assessment of the overall limitations and advantages of the available literature (Fig. 2).

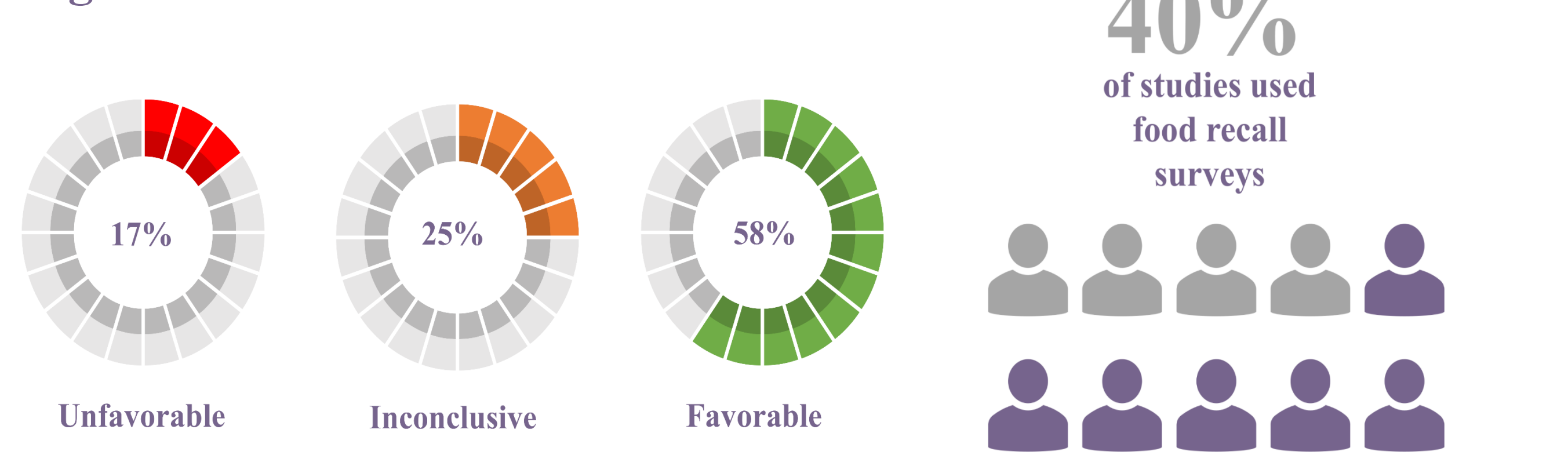
Results

- Review yielded 25 reports, of which 12 studies were deemed to be relevant yielding a total of 63 measures.
- Price incentives for healthy foods combined with restrictions on unhealthy foods yielded the most promising results.
- A wide range of results ranging from 8% decrease to 136% increase reflected the heterogeneity in study design, type of intervention implemented, and outcomes reported.

Table 1: Study outcome measures on subsidies for healthy foods.

| Study | Intervention type | Amount | Outcome | Measurement | Effect | Conclusion | Notes |
|--------------------|-------------------------------------|---|---|-----------------------|--|---|---|
| Andreyeva, 2015 | Vouchers | \$US 6 - \$US 10 on fruit and veg | Volume of fresh fruit and vegetable purchased | Electronic sales data | +17.5% fresh vegetable purchase, +28.6% fresh fruit | Efforts to encourage consumption of fruits and vegetables by people receiving federal food assistance are paying off | • 3x times as much use of vouchers for fruit • Assessed for substitution effects • Compared to baseline |
| Andreyeva, 2016 | Vouchers | \$US 6 - \$US 10 on fruit and veg | Volume of healthy and non-healthy food purchased | Electronic sales data | +3.9% increase healthy foods, -1.8% decrease in moderation foods, -24.7% decrease moderation beverages | Efforts to encourage healthy eating by people receiving federal food assistance are paying off | • Assessed for substitution effects • Compared to baseline |
| Ball, 2015 | Price reduction and skill building | 20% discount on fruit and veg | Volume of fruit and vegetable purchase | Electronic sales data | +15% increase vegetable purchases, +35% increase fruit purchases | Findings show that price modifications can directly increase produce purchases | • Multi-arm and control group • Sugar and diet beverages increased • Increases not maintained 6 month post intervention |
| Brimblecombe, 2017 | Price reduction and education | 20% discount on fruit, veg, diet drinks | Volume of fruit and vegetable purchase | Weekly sales data | +12.7% increase in fruit and vegetable purchased | A 20% discount can only increase fruit and vegetable purchases to help protect against obesity and diet related disease to a certain extent | • Larger effect on fruit yet modest • Education has small additive effect |
| Cardenas, 2015 | Price reduction | 33% discount on fruit | Number of fruits consumed | Food recall surveys | +136% increase fruits sold | Pricing is a barrier to fruit purchasing, discounts lead to significant increases | • Very small sample size, short duration |
| Ferguson, 2017 | Price reduction | 10% discount on fruit, veg, diet drinks | Volume of fruit and vegetable purchase | Electronic sales data | -3% decrease in fruits purchased and -8% decrease in vegetables purchased | no discernible effect was evident, due to inadequate design and communication of discount promotion, and probably inadequate magnitude of discount | • Small sample and limited discount • Non significant p value and very wide CIs |
| Gorham, 2015 | Farmers markets and price reduction | 15% to 25% on fruit and veg | Fruit and vegetable intake | Food recall surveys | +0.48 cups/d increase fruit and vegetable intake | Intervention effective at increasing consumption of fruits and vegetables among racially and ethnically diverse low-income children | • No baseline to compare to |
| Harnack, 2016 | Price reduction with restriction | 30% discount on fruit and vegetable | Energy intake and fruit consumption | Food recall surveys | -96 kcal/d, and +0.2 servings fruit/day | A number of favorable changes were observed in the incentive plus restriction condition suggesting an improvement in nutritional quality | • Multi arm and control group • Combination price and restriction group most significant changes |
| Kristal, 1997 | Coupons and promotion | 50 cent off fruit and vegetable | Fruit and vegetable consumption | Food recall surveys | +8.8% increase in fruit consumption, +11.1% increase in vegetable consumption | More powerful interventions are probably necessary to induce shoppers to purchase and consume more fruits and vegetables. | • Results compared to baseline, compared to control group there is no impact • Not a strong financial incentive |
| Mooney, 2014 | Price reduction (vending machine) | 25% discount healthy vending machine snacks | Healthy snack purchase | Sales receipts | +34.5% increase site A, +1.8% increase site B, +12.9% increase site C, +19.6% increase site D for healthy snack purchase | Price-discounting can be an effective means of initiating more nutritious balanced vending choices among diverse groups of employees in a Scottish population | • Changes not followed long term, unsure about sustainability • Site B had very high baseline uptake (71%) |
| Ni Mhurchu, 2010 | Price reduction with education | 12.5% discount on healthy foods | Fruit and vegetable purchase, healthy food purchase | Electronic sales data | +10% increase fruit and vegetable purchased, +11% increase overall healthy food purchased | Significant and sustained effect of discounts on food purchases suggests that pricing strategies hold promise as a means to improve population diets. | • Multi arm and control group • Education has no effect • Changes sustained after six months but attenuated |
| Olsho, 2016 | Price reduction | 30% discount on fruit and vegetables | Fruit and vegetable consumption | Food recall surveys | +23% increase in fruit consumption, +30% increase in vegetable | Health incentives significantly increased fruit and vegetable intake among participants, | |

Fig. 1: Results of outcome and measures.

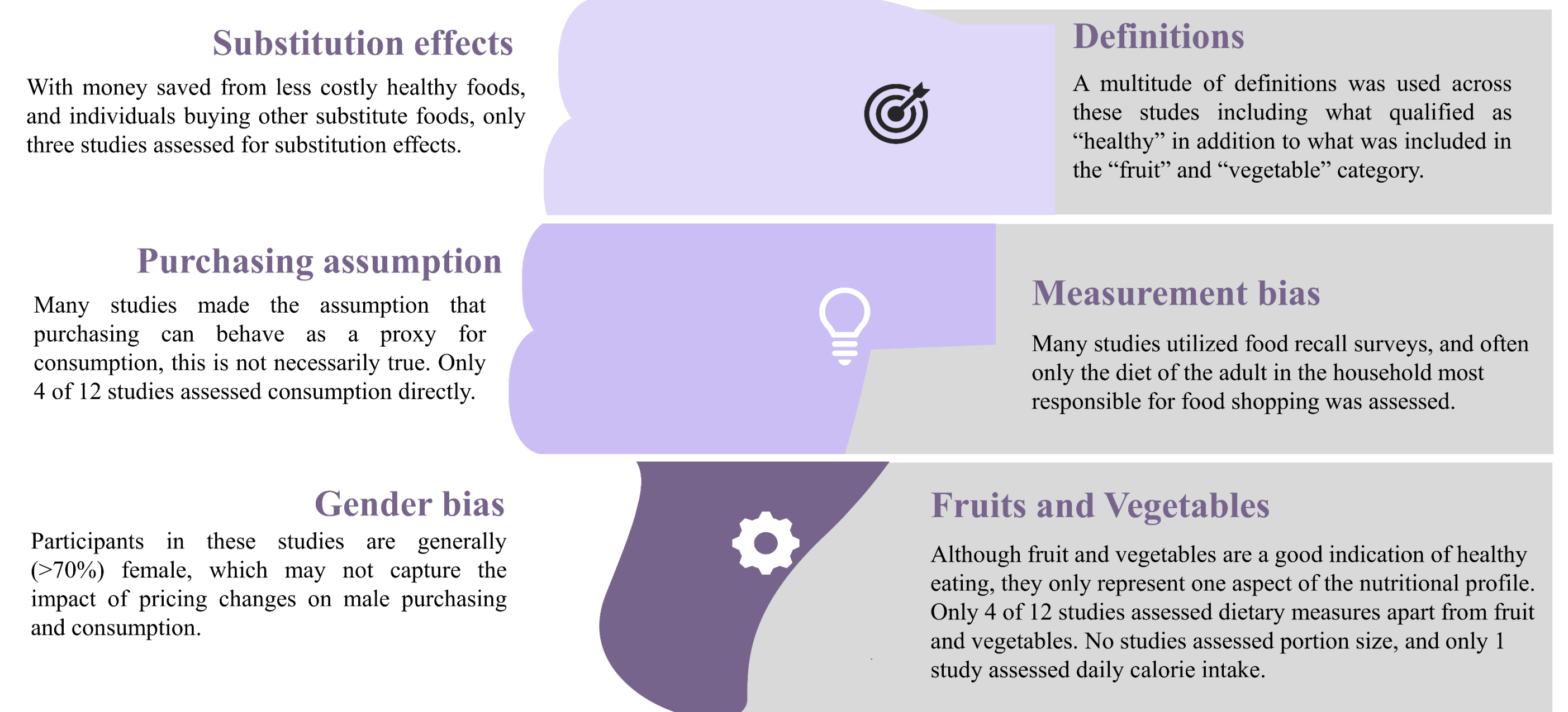


Policy suggestions

- Results suggest that multi-faceted “combination” interventions appear to be the most promising in terms of real changes to purchasing behavior.
- Surprisingly, education appeared to have little to no effect on outcomes.
- Important considerations include the significant heterogeneity in reported outcomes, the notable lack of studies assessing for an overall dietary and nutritional profile, and unknown cost effectiveness.
- In studies that assessed changes long term, effects were either absent or attenuated suggesting a sustainability challenge.
- Policy makers should consider these limitations and further expand the scope of fiscal interventions to include strategies to discourage the purchase of less healthy foods in addition to focusing on healthy foods.

Fig. 2: Limitations and advantages of the available literature.

Limitations and sources of bias



Advantages

Trial design

The majority of the studies were of high quality with regards to study design. 6 of 12 studies were randomized control trials with a further 3 non-randomized control trials.

Relevance

These studies assess targeted interventions that are complex and difficult to evaluate, although the results are of high importance to policy makers looking for more evidence based solutions.

Critical examination

The studies all identify their limitations with many making great efforts to adjust their statistical analyses to account for as many factors as possible, this improves confidence in the reportable outcomes.

