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# Consumer food choices: the role of price and pricing strategies

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## Abstract

*Objective:* To study differences in the role of price and value in food choice between low-income and higher-income consumers and to study the perception of consumers about pricing strategies that are of relevance during grocery shopping.

*Design:* A cross-sectional study was conducted using structured, written questionnaires. Food choice motives as well as price perceptions and opinion on pricing strategies were measured.

*Setting:* The study was carried out in point-of-purchase settings, i.e. supermarkets, fast-food restaurants and sports canteens.

*Subjects:* Adults ( $n$  159) visiting a point-of-purchase setting were included.

*Results:* Price is an important factor in food choice, especially for low-income consumers. Low-income consumers were significantly more conscious of value and price than higher-income consumers. The most attractive strategies, according to the consumers, were discounting healthy food more often and applying a lower VAT (Value Added Tax) rate on healthy food. Low-income consumers differ in their preferences for pricing strategies.

*Conclusions:* Since price is more important for low-income consumers we recommend mainly focusing on their preferences and needs.

**Keywords**  
Pricing  
Low income  
Pricing policy  
Consumers

Dietary intake (e.g. fat, fruit and vegetable consumption) has been found to be important in the prevention of CHD, several types of cancer and obesity. Despite numerous efforts to change dietary behaviour with educational programmes, large proportions of the population still do not comply with dietary guidelines, defined by the WHO and/or national bodies, and the effect of these programmes remains minor<sup>(1,2)</sup>. It is being increasingly acknowledged that policy and environmental interventions should be put in place as, for example, has been done in the case of smoking<sup>(3–5)</sup>. Pricing policy is suggested as being a powerful way to influence dietary behaviour, and might be especially suitable for reaching low-income groups. Low-income groups have a far lower life expectancy than high-income groups and part of this can be explained by lifestyle behaviours, such as dietary behaviour. Being overweight and obesity are also more prevalent among low-income groups<sup>(6)</sup>.

Pricing strategies (e.g. price reductions/increases, the 'buy one get two' strategy, bonus systems) are seen as a promising approach because sales promotions form an important part of the marketing mix<sup>(7,8)</sup>. Furthermore, research has shown that energy-dense foods tend to be cheaper than low-energy-dense foods, and that diets that comply more with dietary guidelines are more expensive than diets that comply less<sup>(9,10)</sup> (also WE Waterlander, I van Amstel, WE de Haas *et al.*, unpublished results). In particular, low-income consumers might experience financial

barriers to healthy eating due to restraints in available resources<sup>(9)</sup>. Finally, various studies showed pricing to be a determinant in food choice, next to taste and quality<sup>(11–13)</sup>.

Few intervention studies have been conducted using pricing policy thus far. These previous studies suggest that consumers respond to changes in food prices<sup>(14–18)</sup>. Although pricing intervention studies showed positive effects, they were limited to a small number of products and were conducted in small-scale settings. There is an ongoing debate as to whether large-scale pricing policies should be implemented to stimulate healthy eating, such as taxing or providing subsidies on healthy products purchased in the supermarket. Intervention studies analysing these kinds of measures are extremely scarce, due to complex implementation issues. A review conducted by Andreyeva *et al.* into price elasticity of demand of several food items showed that mainly food eaten away from home, soft drinks, juice and meat are most price sensitive<sup>(19)</sup>. Still, they could not draw conclusions on the effect of price changes on shifting from unhealthy to healthy food, nor on specific behaviour for at-risk groups such as low-income consumers<sup>(19)</sup>. Duffey *et al.* used observational data to model the potential effects of taxing several high-energy products<sup>(20)</sup>. Results indicated a potential beneficial effect of taxing soft drinks and pizza. A modelling study conducted by Nnoaham *et al.* also showed promising effects of a tax on unhealthy food items combined with a

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subsidy on fruits and vegetables on population health by preventing CVD and cancer<sup>(21)</sup>. Another study of Epstein *et al.* used a laboratory setting in which participants had to perform a hypothetical shopping task<sup>(22)</sup>. They found that taxing less healthy foods (with low nutrient density) reduced purchased energy and improved the macronutrient profile of purchased food. Subsidizing healthy food items, however, increased purchased energy, without any effects on the macronutrient profile. Trials are needed in which such measures are tested in real-life settings. Ni Mhurchu *et al.* conducted a randomized controlled trial in a supermarket setting, with price discounts on healthier food items<sup>(23)</sup>. Their study found significant effects of discounts on the purchase of healthier food items; however, no effect was found on the primary outcome which was change in percentage energy from saturated fat in supermarket purchases. There is a need for more intervention studies using pricing strategies that can be implemented on a large scale in point-of-purchase settings such as supermarkets. Due to complex implementation issues, and political and ethical concerns, it is important to first identify promising pricing strategies with respect to potential effectiveness, feasibility and acceptability among adopters and users of the intervention. Waterlander *et al.* identified some potential pricing strategies based on expert opinions in the Netherlands<sup>(24)</sup>. Among these strategies were taxing and subsidizing, but also marketing techniques such as sales promotions or providing small gifts alongside products with a favourable product composition. To ensure optimal implementation and to anticipate possible effects and side-effects, it is also of importance to study consumers' opinions on pricing issues and pricing interventions. A first qualitative study was reported by Waterlander *et al.* into the perceptions of Dutch low-income consumers about pricing strategies to stimulate healthy eating<sup>(25)</sup>. Price was considered a core factor in food choice and pricing strategies to encourage healthy eating were favoured more than strategies aiming at discouraging unhealthy eating. One of the most promising strategies, according to low-income consumers, was a healthy food discount customer card<sup>(25)</sup>. The aforementioned study was qualitative, and aimed to identify key issues, ideas and thoughts of low-income consumers about price and pricing policy and strategies. In that study, price was used as a broad, general concept to discuss economic factors in buying food. It did not take into account the different concepts of 'price' and 'value'. Price can be seen as 'the amount of money charged for a product', whereas value relates this price to the perceived benefits of having the product<sup>(26)</sup>. Price, as well as value, influences the willingness to buy a certain product, i.e. (healthy) food products. The aims of the current, quantitative study are: (i) to study the differences in the role of both price and value in food choice between low-income and higher-income consumers; and (ii) to study the perception of consumers about pricing strategies that are of relevance during grocery shopping. With the present study,

results of the former qualitative study will be quantified and price and value aspects will be studied more precisely. The results will guide further development of interventions in the economic food environment.

## Methods

### *Design and study population*

A cross-sectional survey was conducted by means of structured, written questionnaires. It took approximately 15 min to fill out the questionnaire. Purposive sampling was used to obtain a sample of Dutch consumers aged from 18 years onwards. An effort was made to include both low- and higher-income consumers by selecting settings in neighbourhoods with a mixed composition. Respondents were recruited in several point-of-purchase settings, i.e. supermarkets (*n* 2), fast-food restaurants (*n* 2) and sport canteens (*n* 1). Recruitment took place in the morning and afternoon hours.

### *Measurements*

General characteristics of respondents were asked: gender (male/female), age (continuous), ethnicity (open question), educational level (five categories following the standard Dutch educational system), work status (working, unfit for work, unemployed, retired, student), gross annual income (six categories from less than €10 000 to more than €40 000), household size (continuous) and an estimation of weekly expenses on food groceries (six categories from less than €50 to more than €150).

The role of price in food choice was measured alongside other food choice motives, based on the Food Choice Questionnaire<sup>(27)</sup>. We used nineteen items compared with thirty-six items in the original Food Choice Questionnaire. The following motives were measured: price (three items), health (two), mood (two), convenience (two), sensory appeal (three), natural content (two), weight control (three) and familiarity (two). All items used a 5-point Likert scale, from 'not important at all' to 'very important'. An example of an item is: 'It is important to me that the food I eat on a typical day gives value for money' (item of price factor). To gain further insight into the role of price and value, a shortened version of the Price Perception Construct Scale Items of Lichtenstein *et al.* was included in the questionnaire<sup>(28)</sup>. This scale measures aspects of price perception that influence willingness to buy products. The following constructs were measured: price-quality schema (i.e. the belief that the level of price is positively related to the quality of the product; two items), value consciousness (three), price consciousness (three), coupon proneness (two) and sale proneness (two). A 5-point Likert scale was used for each, ranging from 'totally disagree' to 'totally agree'. An example of an item is: 'I have favorite brands, but most of the time I buy the brand that's on sale' (item of sale proneness).

### Pricing strategies

Respondents' opinions were asked on a number of pricing strategies. These pricing strategies were derived from two studies that were conducted earlier. The first one was a Delphi study among experts on most suitable monetary incentives to stimulate healthy eating<sup>(24)</sup>. The second was a focus group study among consumers in which potential pricing strategies were discussed<sup>(25)</sup>. Table 1 shows the pricing strategies that were included in the questionnaire used in the current study. Four questions were asked about each strategy: one item with respect to the attractiveness of the strategy, one about the potential effectiveness in terms of eating more healthy foods, one about the potential effectiveness of eating less unhealthy foods, and finally one item on whether the strategy was perceived as patronizing. All items had 5-point Likert scales ranging from 'not at all' to 'very much'.

### Statistical analysis

Educational level was recoded into three categories corresponding to the commonly used classification in the Netherlands: low (primary school or basic vocational education); medium (secondary vocational education or high-school degree); and high (higher vocational education or university degree). Income level was also recoded into three categories: low (e.g. below standard <€20 000), medium (e.g. around standard €20 000–€30 000) and high (e.g. above standard >€30 000). The standard net annual income in the Netherlands in 2010 was €19 367<sup>(29)</sup>. Mean scores were calculated per food choice motive, ranging from 1 to 5, and also for the different constructs of price perception. Reliability of these factors was analysed using Cronbach's alpha. All food choice motives had a Cronbach's  $\alpha$  of 0.70 or higher, except for the factor 'convenience', for which  $\alpha = 0.49$ . Regarding the price perception constructs, Cronbach's  $\alpha$  of 0.75 and higher were found. Independent *t* tests were used to test for differences between low- and high-income respondents with respect to food choice motives, the constructs of price perception and the perception of pricing strategies.

## Results

### Respondent characteristics

In total, *n* 159 agreed and indeed participated (approximately 250 respondents had to be asked to reach this number). The mean age of the respondents was 37.7 (SD 17.4) years. The average number of people living in their household (respondents themselves included) was 2.7 (SD 1.5). Table 2 shows other characteristics of the respondents. More than half were female. The majority were of Dutch ethnicity with a small group of Turkish–Dutch background, one of the largest immigrant groups in the Netherlands. About 40% of the respondents had a low income level (*n* 61), and a comparable proportion had a high income level (*n* 68).

**Table 1** Pricing strategies

Pricing strategy
1. Healthy food options at a lower VAT* rate
2. Tax rise on unhealthy food items
3. Bonus for low-income consumers assigned when a certain amount of healthy products are purchased
4. Discounting healthy food options more often
5. Offering an additional healthy product for free on the purchase of a healthy product
6. Offering small presents/extras with healthy food items
7. Making unhealthy products more expensive in order to finance subsidies on healthy food items
8. 'Buy one, get two' for healthy food items

\*VAT, Value Added Tax; the standard VAT rate in the Netherlands is 19%.

**Table 2** Characteristics of respondents (*n* 159), the Netherlands

	%	<i>n</i>
Gender		
Male	40	64
Female	58	92
Unknown	2	3
Ethnicity		
Dutch	83	132
Turkish–Dutch	8	13
Other	9	14
Educational level		
Low	13	20
Medium	31	50
High	52	83
Unknown	4	6
Work status		
Working	58	92
Unfit for work/unemployed	8	13
Retired	11	18
Other (i.e. student)	17	27
Unknown	6	9
Annual household income		
Low (<€20 000)	38	61
Medium (€20 000–€30 000)	8	13
High (>€30 000)	43	68
Unknown	11	17
Weekly food grocery spending		
<€50	13	21
€50–€75	23	36
€75–€100	18	28
€100–€125	18	28
€125–€150	12	19
>€150	10	16
Unknown	7	11
Age (years)		
Mean	37.7	
SD	17.4	

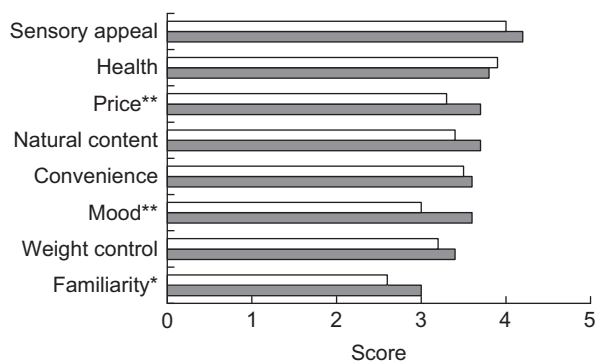
### Role of price and value in food choice

All measured food choice motives were, to some extent, of importance to the respondents, with sensory appeals and health reasons being the most important motives for the entire research group (mean score (SD) 4.1 (0.7) and 3.9 (0.7), respectively). Figure 1 shows the mean scores on food choice motives for low (*n* 61) and high (*n* 68) income respondents. For the low-income group, compared with the high-income group, price was significantly

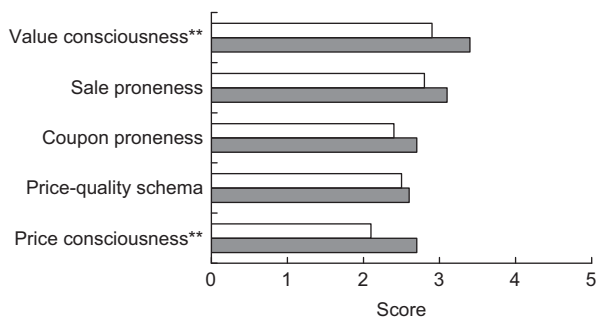
more important ( $\chi(126) = 3.29, P = 0.001$ ; mean score (SD) 3.7 (0.8) and 3.3 (0.7), respectively), mood was significantly more important ( $\chi(126) = 3.47, P = 0.001$ ; mean score (SD) 3.6 (0.9) and 3.0 (0.9), respectively), and also being familiar with the products was significantly more important ( $\chi(127) = 2.15, P = 0.034$ ; mean score (SD) 3.0 (1.1) and 2.6 (1.1), respectively).

Scores on the price perception constructs were somewhat lower, with the highest scores on value consciousness

(mean 3.2, SD 1.05) and sale proneness (mean 3.0, SD 0.98) for the entire research group. Figure 2 shows mean scores for low- and high-income respondents. Low-income respondents had significantly higher scores on value consciousness ( $\chi(125) = 2.69, P = 0.008$ ; mean score (SD) 3.4 (1.0) and price consciousness ( $\chi(124) = 2.66, P = 0.009$ ; mean score (SD) 2.7 (1.0)) compared with high-income respondents (mean score (SD) 2.9 (1.0) and 2.1 (1.1), respectively).



**Fig. 1** Food choice motives among low-income (■) and high-income (□) consumers (n 159), the Netherlands. Mean score was significantly different between groups: \* $P < 0.05$ , \*\* $P < 0.01$



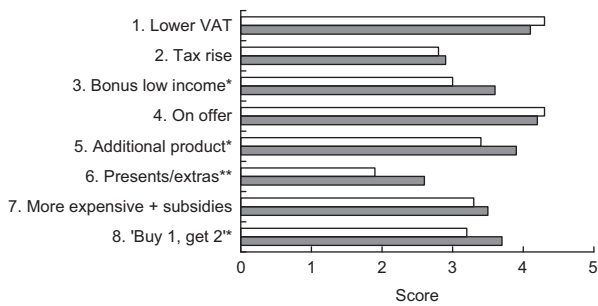
**Fig. 2** Price perception constructs motives among low-income (■) and high-income (□) consumers (n 159), the Netherlands. Mean score was significantly different between groups: \* $P < 0.05$ , \*\* $P < 0.01$

**Pricing policy and strategies**

Table 3 shows consumers' judgement about the pricing policies and strategies. The most attractive strategies, according to the consumers, were discounting healthy food more often and applying a lower VAT (Value Added Tax) rate on healthy food. These strategies also had relatively high scores on expectations that the measure would lead to eating more healthy products. However, expectations that these measures would lead to eating less unhealthy food were somewhat lower. The least patronizing pricing policy, according to consumers, was to put healthy food in a lower VAT rate. They experienced a bonus for low-income consumers when a certain amount of healthy products are purchased and making unhealthy products more expensive in order to finance subsidies on healthy food items as most patronizing of all the presented pricing strategies (see also Table 3). Figure 3 shows the differences between high- and low-income consumers with respect to their judgement about the attractiveness of the pricing strategies. Some strategies were favoured more by low-income consumers, including the bonus for low-income consumers ( $t(127) = 2.45, P = 0.016$ ; mean score (SD) 3.6 (1.3) v. 3.0 (1.5)), offering an additional healthy product for free after the purchase of a healthy product ( $t(125) = 2.28, P = 0.024$ ; mean score (SD) 3.9 (1.1) v. 3.4 (1.4)) and the 'buy one, get two' strategy ( $t(125) = 2.12, P = 0.037$ ; mean score (SD) 3.7 (1.3) v. 3.2 (1.3)). Although low-income consumers found offering small presents or extras with healthy products significantly more attractive than high-income consumers ( $t(125) = 3.17, P \leq 0.01$ ; mean score (SD) 2.6 (1.5)

**Table 3** Consumers' (n 159) judgement of pricing strategies, the Netherlands

Pricing strategy	Attractive (score 1–5)		More healthy (score 1–5)		Less healthy (score 1–5)		Patronizing (score 1–5)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1. Healthy food at a lower VAT rate	4.2	1.1	3.7	1.3	3.0	1.3	2.5	1.3
2. Tax rise on unhealthy food items	2.8	1.5	2.8	1.4	2.7	1.4	3.2	1.3
3. Bonus for low-income consumers after certain amount of healthy products purchased	3.3	1.4	3.2	1.4	2.8	1.3	3.3	1.3
4. Discounting healthy food more often	4.3	0.8	3.9	1.1	3.2	1.3	2.8	1.3
5. Additional healthy product for free	3.7	1.3	3.5	1.3	2.9	1.3	3.1	1.2
6. Presents/extras with healthy food items	2.3	1.4	2.2	1.4	2.1	1.3	3.3	1.4
7. Unhealthy food more expensive, to finance subsidies on healthy food	3.4	1.3	3.3	1.3	3.0	1.3	3.0	1.3
8. 'Buy one, get two' for healthy products	3.4	1.3	3.3	1.3	2.8	1.2	2.9	1.2



**Fig. 3** Attractiveness of pricing strategies motives among low-income (■) and high-income (□) consumers ( $n = 159$ ), the Netherlands. Mean score was significantly different between groups: \* $P < 0.05$ , \*\* $P < 0.01$

and 1.9 (1.2), respectively), this strategy received rather low scores compared with the other strategies.

## Discussion

The first aim of the present study was to examine whether the role of price and value in food choice differed between low- and high-income consumers. The second aim was to study the perception of consumers about pricing strategies that can be applied on a large scale. Results indicate that price is an important factor in food choice, and, not surprisingly, this counts especially for low-income consumers. Since price is of importance to this group, pricing strategies seem promising to influence dietary behaviour. This is in line with results of other studies into pricing strategies with respect to various other health behaviours, such as smoking<sup>(3)</sup> or physical activity<sup>(30)</sup>. Regarding *which* pricing strategy should be put in place to change dietary behaviour, some remarks can be made based on the study results.

First of all, it seems important to choose strategies that are perceived as attractive by the target group. Results clearly show that some strategies are perceived as being more attractive than others. The most attractive strategies found in our study were discounting healthy food items more often and applying a lower VAT rate to healthy food. Politically, the latter is a complex issue; however, it should not be put aside immediately as experts in an earlier study also had high expectations regarding the potential feasibility and effectiveness of this measure<sup>(24)</sup>. Yet, in that same study, it was concluded that experts had the tendency to expect the most of pricing strategies for which the implementation responsibilities could be placed elsewhere (i.e. government *v.* industry), and mainly the industry favoured the VAT measure. Discounting healthy food more often, on the other hand, might be more feasible in the short term, and is in accordance with the relative high score we found on sale proneness compared with the other price perception constructs as well. Also, price promotions are suggested to have a bigger impact

than price reductions since consumers have the tendency to buy a product just because it is on sale<sup>(31)</sup>. Finally, value consciousness had the highest scores of the price perception constructs, and low-income people scored significantly higher than high-income consumers. This underlines the importance of public health interventions targeting the economic environment not only to focus on price, but on value as well. Also, in future intervention studies, effects should be evaluated separately for low- and high-income consumers.

Second, it is of vital importance that the strategies to be chosen are not only effective in encouraging eating more products with a favourable product composition (such as fruit and vegetables), but at the same time keep total energy intake stable or preferably decrease total energy intake. Comparable to a qualitative study into consumers' opinions on pricing strategies<sup>(25)</sup>, we found that consumers are more in favour of positive strategies (bonus or subsidy) as opposed to negative strategies (tax rise). However, these positive strategies might bear the risk that total energy intake increases. In a study of Epstein *et al.*, respondents performed a purchasing task in the laboratory<sup>(22)</sup>. Results indicated that taxing less healthy foods reduced the total number of purchased energy, whereas subsidizing healthy foods increased the total number of purchased energy. Ni Mhurchu *et al.* found in their study when discounting all healthier food products in a supermarket (i.e. core food products meeting Tick programme criteria) that saturated fat purchases, total fat purchases and energy density of the purchased food products did not differ between the control (regular prices) and experimental group (12.5% discount). However, they did find that the experimental group purchased a significant higher quantity of healthier food products<sup>(23)</sup>. It is therefore worthwhile investigating whether a price rise of unhealthy food items with parallel subsidizing healthy food items avoids the risk of a stable or even an increase in total energy intake while at the same time the preference of consumers can be taken into account. Our results show that a strategy in which the prices of unhealthy food items are increased to finance subsidies on healthy food items is favoured over a strategy consisting solely of a tax rise of unhealthy food items (mean scores on attractiveness respectively 2.8 and 3.4 on a scale from 1 to 5). Of course, the definition of 'healthy' and 'unhealthy' food items is very important in this respect. Nutrient profiling systems taking different macronutrients as well as energy density into account can be helpful in this<sup>(32)</sup>.

The present study has some limitations. We used purposive sampling methods and, as a consequence, the respondent group is not representative for the entire Dutch population. Compared with the general population, our respondents generally had a higher education level<sup>(33)</sup> and a lower employment level<sup>(34)</sup>. Regarding generalization, cultural differences might also play a role. The acceptance of governmental interventions, for

example, might differ across countries. Another limitation includes the use of shortened versions of the Food Choice Questionnaire and the Price Perception Construct Scale. We chose shortened versions because of reasons of time, as respondents had to fill out the questionnaire right away, in the point-of-purchase setting where they were recruited. The use of shortened versions might have harmed the validity and reliability of the scales. Regarding reliability, all scales had sufficient Cronbach's  $\alpha$  values, except for the food choice factor 'convenience', which should be interpreted with caution. Another limitation is that we did not include other factors than level of income that might influence sensitivity to price as well. For future studies, it would be interesting to include such factors as nutritional knowledge for example. Finally, the study is based on self-reported opinions of consumers. Only intervention studies can prove how consumers would really react to pricing strategies. It could be that consumers' expectations on whether they would eat more healthily as a result of the strategies do not fully comply with their actual behaviour when confronted with price measures.

In conclusion, the present study provides insights into consumers' perspectives towards pricing strategies. Together with expert views it can provide a basis for selecting appropriate pricing strategies to test in intervention studies. Since price is more important for low-income consumers we recommend mainly focusing on their preferences and needs.

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### References

- Giskes K, Turrell G, van Lenthe FJ *et al.* (2006) A multilevel study of socio-economic inequalities in food choice behaviour and dietary intake among the Dutch population: the GLOBE study. *Public Health Nutr* **9**, 75–83.
- Irala-Estevez JD, Groth M, Johansson L *et al.* (2000) A systematic review of socio-economic differences in food habits in Europe: consumption of fruit and vegetables. *Eur J Clin Nutr* **54**, 706–714.
- Chopra M & Darnton-Hill I (2004) Tobacco and obesity epidemics: not so different after all? *BMJ* **328**, 1558–1560.
- Kim D & Kawachi I (2006) Food taxation and pricing strategies to 'thin out' the obesity epidemic. *Am J Prev Med* **30**, 430–437.
- Nestle M & Jacobson MF (2000) Halting the obesity epidemic: a public health policy approach. *Public Health Rep* **115**, 12–24.
- Hulshof KF, Brussaard JH, Kruizinga AG *et al.* (2003) Socio-economic status, dietary intake and 10 year trends: the Dutch National Food Consumption Survey. *Eur J Clin Nutr* **57**, 128–137.
- Han S, Gupta S & Lechmann DR (2001) Consumer price sensitivity and price thresholds. *J Retail* **77**, 435–456.
- Hawkes C (2009) Sales promotions and food consumption. *Nutr Rev* **67**, 333–342.
- Drewnowski A (2004) Obesity and the food environment: dietary energy density and diet costs. *Am J Prev Med* **27**, 3 Suppl., 154–162.
- Waterlander WE, de Haas WE, van Amstel I *et al.* (2010) Energy density, energy costs and income – how are they related? *Public Health Nutr* **13**, 1599–1608.
- Cassady D, Jetter KM & Culp J (2007) Is price a barrier to eating more fruit and vegetables for low-income families? *J Am Diet Assoc* **107**, 1909–1915.
- European Commission (2006) Risk Issues. Special Eurobarometer 238/Wave 64.1. [http://ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_238\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_238_en.pdf) (accessed June 2010).
- Glanz K, Basil M, Maibach E *et al.* (1998) Why Americans eat what they do: taste, nutrition, cost, convenience, and weight control concerns as influences on food consumption. *J Am Diet Assoc* **98**, 1118–1126.
- French SA (2003) Pricing effects on food choices. *J Nutr* **133**, 841S–843S.
- French SA, Jeffery RW, Story M *et al.* (2001) Pricing and promotion effects on low-fat vending snack purchases: the CHIPS Study. *Am J Public Health* **91**, 112–117.
- French SA, Story M, Jeffery RW *et al.* (1997) Pricing strategy to promote fruit and vegetable purchase in high school cafeterias. *J Am Diet Assoc* **97**, 1008–1010.
- Horgen KB & Brownell KD (2002) Comparison of price change and health message interventions in promoting healthy food choices. *Health Psychol* **21**, 505–512.
- French SA, Hannan PJ, Harnack IJ *et al.* (2010) Pricing and availability intervention in vending machines at four bus garages. *J Occup Environ Med* **52**, Suppl. 1, S29–S33.
- Andreyeva T, Long MW & Brownell KD (2010) The impact of food prices on consumption: a systematic review of research on the price elasticity of demand for food. *Am J Public Health* **100**, 216–222.
- Duffey KJ, Gordon-Larsen P, Shikany JM *et al.* (2010) Food price and diet and health outcomes. *Arch Intern Med* **170**, 420–426.
- Noaham KE, Sacks G, Rayner M *et al.* (2009) Modelling income group differences in the health and economic impacts of targeted food taxes and subsidies. *Int J Epidemiol* **38**, 1324–1333.
- Epstein LH, Dearing KK, Roba LG *et al.* (2010) The influence of taxes and subsidies on energy purchased in an experimental purchasing study. *Psychol Sci* **21**, 406–414.
- Ni Mhurchu C, Blakely T, Jiang Y *et al.* (2010) Effects of price discounts and tailored nutrition education on supermarket purchases: a randomized controlled trial. *Am J Clin Nutr* **91**, 736–747.
- Waterlander WE, Steenhuis IH, de Vet E *et al.* (2010) Expert views on most suitable monetary incentives on food to stimulate healthy eating. *Eur J Public Health* **20**, 325–331.
- Waterlander WE, de Mul A, Schuit AJ *et al.* (2010) Perceptions on the use of pricing strategies to stimulate healthy eating among residents of deprived neighbourhoods: a focus group study. *Int J Behav Nutr Phys Act* **7**, 44.
- Kotler P, Armstrong G & Wong V (2008) *Principles of Marketing*, 5th European ed. London: Prentice Hall/Pearson Education Limited.

27. [Steptoe A, Pollard TM & Wardle J \(1995\) Development of a measure of the motives underlying the selection of food: the food choice questionnaire. \*Appetite\* \*\*25\*\*, 267–284.](#)
28. Lichtenstein DR, Ridgway NM & Netemeyer RG (1993) Price perceptions and consumer shopping behavior: a field study. *J Market Res* **30**, 234–245.
29. Centraal Planbureau (2010) *Modaal inkomen (Standard Income)*. Den Haag: CPB.
30. [Steenhuis IHM, Moes MJG, Nooij SBC \*et al.\* \(2009\) Financial barriers and pricing strategies related to participation in sports activities: low income people's perceptions. \*J Phys Act Health\* \*\*6\*\*, 716–721.](#)
31. Blattberg RC, Briesch R & Fox EJ (1995) How promotions work. *Mark Sci* **14**, G122–G132.
32. [Drewnowski A \(2010\) The Nutrient Rich Foods Index helps to identify healthy, affordable foods. \*Am J Clin Nutr\* \*\*91\*\*, 1095S–1101S.](#)
33. Centraal Bureau voor de Statistiek (2010) *Opleidingsniveau Nederlandse bevolking (Educational level of the Dutch population)*. Den Haag/Heerlen: Centraal Bureau voor de Statistiek.
34. Centraal Bureau voor de Statistiek (2010) *Sociale Monitor (Social Monitor)*. Den Haag/Heerlen: Centraal Bureau voor de Statistiek.