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ASSESSMENT OF THE IMPACT OF A PUBLIC HEALTH PRODUCT TAX

Final report
Budapest, November 2015

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Abbreviations

PHTP	Public Health Product Tax
OTÁP 2014	National Diet and Nutrition Status Survey 2014

1. Executive summary

The effect of the "public health product tax" (PHPT)[1] on health and social policy was evaluated 4 years after its introduction, as review and assessment of its impact were among the tasks outlined in the national "Healthy Hungary 2014–2020" strategy. More and more countries are introducing taxes on foods to improve the diet of the population. As complex evaluations based on real data over several years are not widely available at international level, sharing the Hungarian experience could be of considerable interest. The WHO Regional Office for Europe provided financial support for this impact assessment.

The objectives of this second impact assessment of the PHPT were (i) to assess whether the impact found earlier among adults on the consumption of taxed products has been sustained, (ii) to study how consumption has changed in population groups with different health risks and socioeconomic status and (iii) to determine the economic consequences of the tax paid by companies.

The impact assessment was conducted in 2014 as part of the National Diet and Nutritional Status Survey (OTÁP 2014) of the National Institute for Food and Nutritional Science on a subsample of the population covered by the European Health Interview Survey performed by the Hungarian Central Statistical Office. In addition to this questionnaire survey, participants' height, weight and waist circumference were measured to estimate the nutritional status of the adult Hungarian population and the prevalence of obesity and overweight. The intake of nutrients and patterns of food consumption were assessed from nutrition diaries kept by participants. The study also provided data on various health issues and on socioeconomic status. The National Tax and Customs Administration of Hungary provided data on the revenue collected from the PHPT.

The most important results are:

The PHPT has had a long-term impact.

- Most consumers (59–73%) sustained reduced consumption of the target products.
- The consumption of 19–36% of the participants was even lower than in the first impact assessment.

The health literacy of consumers has improved over that in the first impact assessment.

- In the second assessment, significantly more people had reduced their consumption because they learnt that the product was unhealthy rather than because of the price increase.
- The higher price of sugary soft drinks became the second reason for reduced consumption.

Among those who changed their consumption:

- 7–16% chose cheaper products,
- 5–16% consumed less,
- 5–11% chose another brand of the product, and
- 2–6% substituted other types of food product.

Most of those who made substitutions chose a healthier alternative.

- The most frequent healthier alternatives were mineral water (63%), fresh fruit and vegetables (82–86%), home-made sweets (95%) and green herbs and spices (84%).

[1] Act CIII of 2011 on Public Health Product Tax

Weight had a strong effect on consumption change, particularly by reducing consumption:

- A higher proportion of overweight and obese adults than of adults who were underweight or of normal weight changed their consumption habits.
- Overweight and obese adults were 1.8–2.7 times more likely to change their consumption than adults who were underweight or of normal weight (independently of sex and age).
- With regard to different product groups, overweight and obese adults were even more likely (1.5–4.3 times) to reduce their consumption than adults who were underweight or of normal weight.

Socioeconomic status had a substantial effect on changing consumption.

- For each product group, a higher proportion of adults with primary education than of those with higher education changed their consumption.
- A higher proportion of adults with a lower level of education than of those with higher education chose a cheaper product (two to seven times more, depending on the product group).
- A significantly higher proportion of adults with a lower level of education chose a different brand (three to ten times more, depending on the product group).
- The proportion of adults who reduced their consumption did not differ significantly by level of education for any product group.
- Only 0–20% of people with a lower level of education reduced their consumption because they learnt that the product was unhealthy.

Since introduction of the PHPT, HUF 61.3 billion (€200 million) have been generated, corresponding to the planned revenue.

- The top 50 tax-paying companies paid 90% of the total tax revenue, and the proportion remained similar over the years.
- Tax on four product groups accounted for 90% of the total PHPT revenue and, in 2014, for half the total revenue generated on pre-packaged sugar-sweetened products, 16% on salty snacks, 14% on salty condiments and 9% on soft drinks. These proportions did not change significantly over the years.
- Sugar-sweetened soft drinks (kg/L) represent the highest proportion (65%) of the trade that forms the basis of the reported tax. The second highest component is pre-packaged sweets (19%) and the third, energy drinks (8%). Salty snacks and powdered soups and salty condiments each contributed 3% to the total PHPT.

The revenue generated by the PHPT made it possible to raise the wages of 95 000 health care workers.

We conclude that the PHPT has achieved its public health goal in both the short and the long term. Consumption of the taxed products has decreased, and the decrease has generally been maintained. One important result is that more than two thirds of the people who changed products chose a healthier alternative. As two thirds of Hungarian adults are overweight or obese, another important public health achievement is that these groups were more likely to reduce their consumption of the taxed products. The health literacy of the population has improved, although more people with primary education than those with higher educational attainment changed to a cheaper product, and we do not know whether the cheaper products were healthier. The PHPT has also achieved its economic goals, as the planned revenue has been realized each year. The revenue made it possible to increase the wages of health sector workers by 25% in two stages.

Recommendations

Targeted health communication and other policies could be used to extend the impact of the food tax to other population groups, especially those with lower educational levels. In order to reach these people, local, targeted awareness-raising and educational programmes and complementary measures should be conducted.

Consideration should also be given to introducing price subsidies for healthy food products, such as fruits and vegetables.

It is recommended that the PHPT be raised on certain products, such as sugar-sweetened soft drinks. The additional revenue could be used for public health programmes, targeted health communication and further nutrition-related interventions.

The impact of the PHPT should continue to be monitored and evaluated.

2. Introduction

More and more countries are using fiscal policies to promote healthy diets. According to WHO, food taxes and subsidies to promote healthy diets are regarded as cost–effective population-level measures that help reduce the risk factors for noncommunicable diseases.[2] In the European Food and Nutrition Action Plan 2015–2020,[3] fiscal measures are recommended to ensure access to a healthy diet and beverages and a healthy, sustainable food chain.[4] According to the Organisation for Economic Co-operation and Development, fiscal measures should be an integral part of strategies to prevent overweight and obesity.[2] The Special Rapporteur of the United Nations Human Rights Council reported that taxation of unhealthy food products and beverages (high in fat, salt and sugar) can be effective for promoting a healthy diet.[5] The meeting of the National Heart Forum in the United Kingdom in June 2012 concluded that application of additional taxes on foods known to be unhealthy should be part of a package of public health policies for a proportionate response to the current crisis in diet.[6]

In Hungary, the "public health product tax" (PHPT) entered into force in September 2011, with the aims to "reduce the consumption of food products that are not useful from a public health point of view and to promote a healthy diet ... to make healthy food choices accessible and to improve public funding for health care services, especially public health programmes". One year after the entry into force, the National Institute for Health Promotion conducted an impact assessment, in cooperation with the National Institute for Food and Nutrition Science. The aims of the first assessment were to identify any changes in the consumption and attitude of the population and in tax revenues and to assess the economic impact of the tax on producers and manufacturers.[7] The results showed that the supply and turnover of products containing ingredients with proven harmful effects on health had been reduced. People had decreased their consumption of these products, and the planned tax revenues were realized.

The first assessment could not, however, cover the entire range of issues. From a public health point of view, it is important to know the kinds of food products customers use to substitute taxed products. A controversial issue is whether the tax is progressive or regressive, i.e. whether it has a stronger impact on low-income population groups. It is also important to determine whether consumption changes differently in groups with nutrition- or diet-related health risks.

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[2] Global status report on noncommunicable diseases. Geneva: World Health Organization; 2011.
[3] European action plan for food and nutrition policy 2007–2012. Copenhagen: WHO Regional Office for Europe; 2008.
[4] Using price policies to promote healthier diets, Copenhagen: WHO Regional Office for Europe; 2015.
[5] De Schutter O. The right to an adequate diet: the agriculture-food-health nexus. In: United Nations Human Rights Council, 19th session, Agenda item 3. Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the right to development. Report submitted by the Special Rapporteur on the right to food. Letöltve; 2013 (http://daccess-ods.un.org/TMP/965676.382184029.html).
[6] Landon J, Graff H. What is the role of health-related food duties? A report of a National Heart Forum meeting held on 29 June 2012. London: National Heart Forum; 2012.
[7] Bakacs M, Vitrai J, editors. Impact assessment of the public health product tax. Budapest: National Institute for Health Promotion; 2013 (http://www.oefi.hu/NETA_hatasvizsgalat.pdf, accessed 13 June 2015).

The second impact assessment of the PHPT was designed to answer the following questions:

1. Has the impact of the PHPT on consumer behaviour been sustained?
2. Have customers substituted taxed products with others?
3. If so, are the substituted food products healthier?
4. Does the nutritional status of consumers influence their changes in consumption?
5. Does the consumers' socioeconomic status influence their changes in consumption?
6. How has the annual budget revenue changed since the entry into force of the PHPT?
7. To what extent were the revenue estimates realized?
8. What are the trends in trade of the taxed food products?
9. Which public health objectives were funded by revenue from the PHPT?

3. Methods

The impact assessment was conducted in the framework of the OTÁP 2014 study by the National Institute for Food and Nutrition Science on a subsample of the European health interview survey 2014 in Hungary carried out by the Hungarian Central Statistical Office. In the OTÁP 2014 study, the participants not only filled in the questionnaire but were also measured for weight, height and waist circumference by standard methods. The participants kept a 3-day nutrition diary, which allowed us to estimate the amounts they consumed of selected nutrients of high dietary risk. Background socioeconomic data were available from the European health interview survey 2014 in Hungary.

From this sample of the adult population, we estimated prevalence and applied a multivariate regression model to analyse associations between certain variables. Tax revenue in 2011 was provided by the National Tax and Customs Administration, broken down by product type, the amount of revenue and the number of companies that filed reports.

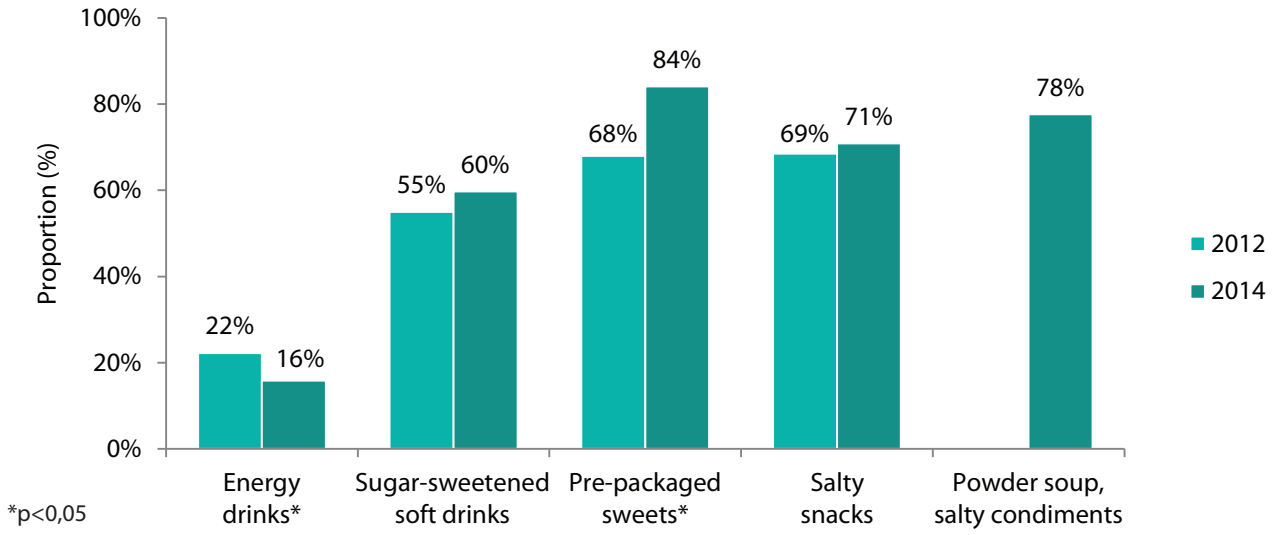
The detailed methods used for the impact assessment are described in Annex 1.

4. Results

4.1 Consumption of products with public health taxes

In 2014, 84% of adults consumed pre-packaged sweets, 78% consumed powdered soup and salty condiments, 71% consumed salty snacks, 60% drank sugar-sweetened soft drinks, and 16% drank energy drinks (Fig. 1). The consumption of energy drinks had decreased since 2012 (from 22% to 16%), but the proportion of people eating pre-packaged sweets increased (from 68% to 84%). The consumption of the other products did not change significantly.

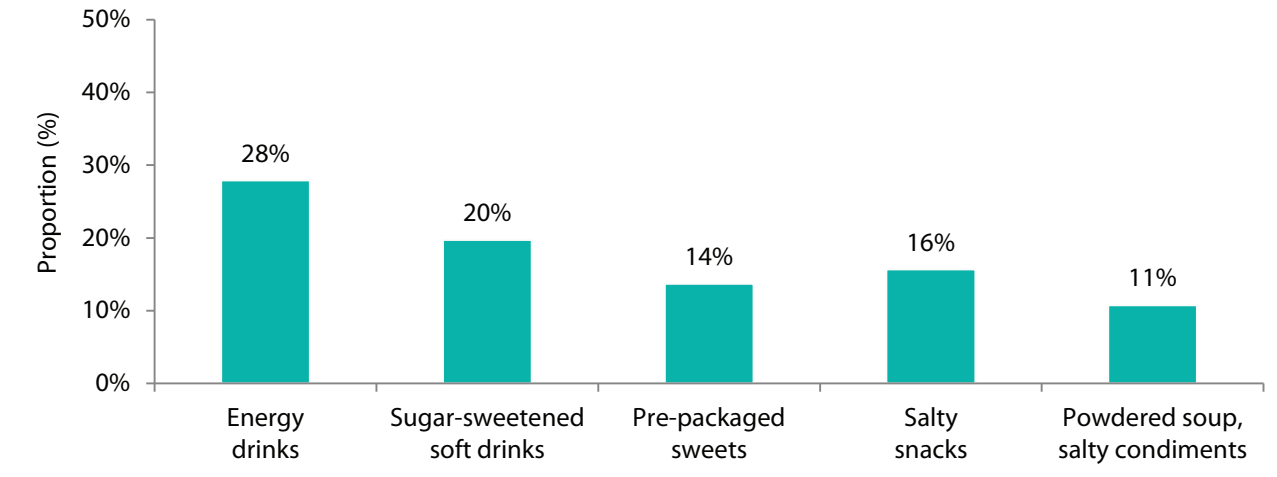
Fig. 1. Proportions of people consuming PHPT products, 2012 and 2014



4.2 Changes in consumer behaviour

The survey included many options for describing changes in consumer behaviour. We analysed not only on whether consumption decreased or increased but also whether customers chose cheaper products or different brands or substituted different food products. We found that 11–28% of the people who consumed PHPT products had changed their consumption since entry into force of the law (Fig. 2). The greatest change was in consumption of energy drinks (28%), and every fifth person who consumed sugar-sweetened soft drinks had changed their consumption habit. Consumers who bought salty snacks and pre-packaged sweets changed these habits, by 16% and 14%, respectively, while 11% of people who ate powdered soup and salty condiments changed their consumption.

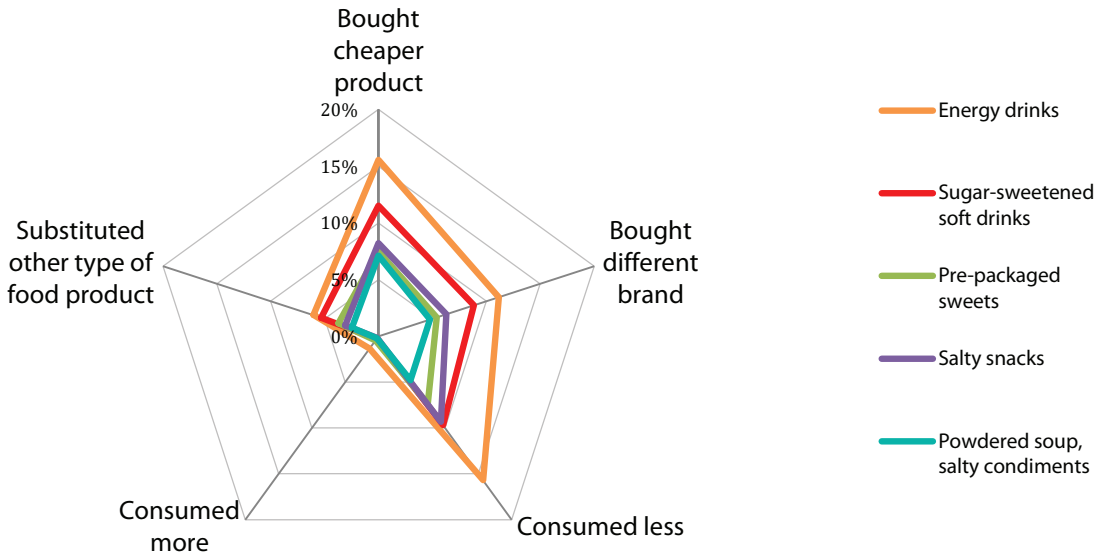
Fig. 2. Proportions of change in consumption of PHPT, 2014



We conclude that the greatest change was in the consumption of energy and sugar-sweetened soft drinks.

Of those who consumed PHPT products, 7–16% chose cheaper ones, while 5–16% reduced their consumption (Fig. 3). Depending on the product group, 5–11% of consumers changed to a different brand, and 2–6% substituted different products. Less than 1% of people who consumed PHPT products stated that they had increased their consumption after introduction the tax.

Fig. 3. Consumption change, 2014



4.3 Reasons for reducing consumption

In 2014, most people reduced their consumption of product groups because of the increased prices (Table 1), while most people reduced their consumption of sugar-sweetened soft drinks because they learnt that these products were unhealthy. Higher prices were cited as the reason for changing consumption of pre-packaged sweets and salty snacks by 81% of people in 2012 and by 66% and 56%, respectively, in 2014. Those who reduced their consumption were two or three times more aware that the product was unhealthy.

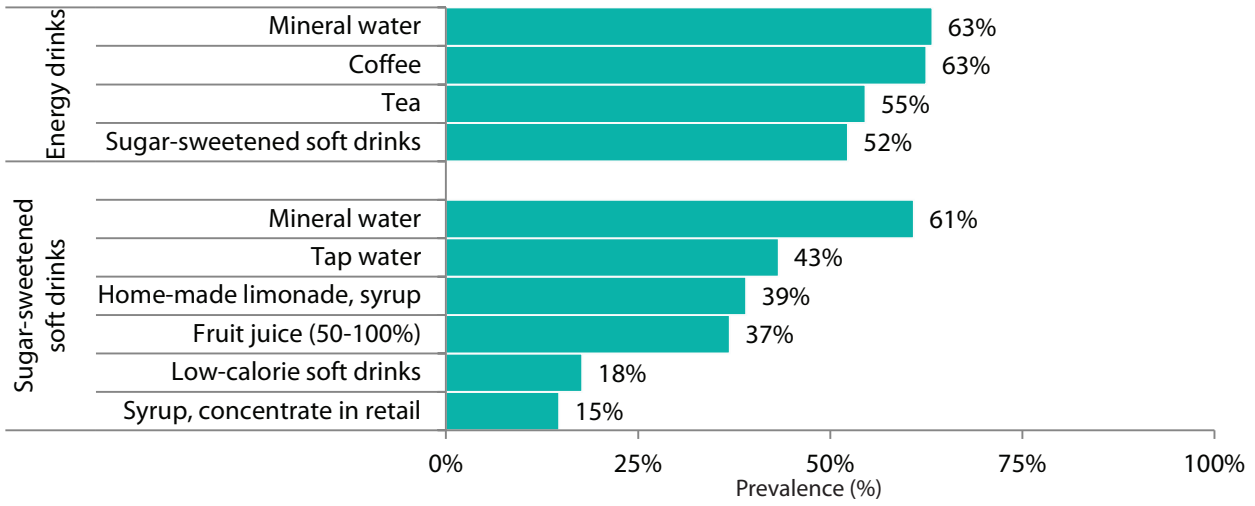
Table 1. Most frequent reasons for decreasing consumption, 2012 and 2014

Product	Price increase		Learnt that unhealthy	
	2012	2014	2012	2014
Energy drinks	61%	67% ↑	38%	54% ↑
Sugar-sweetened soft drinks	67%	51% ↓	27%	54% ↑
Pre-packaged sweets	81%	66% ↓	22%	47% ↑
Salty snacks	81%	56% ↓	19%	50% ↑
Powdered soup, salty condiment	–	69%	–	37%

4.4 Substitution of product with public health taxes

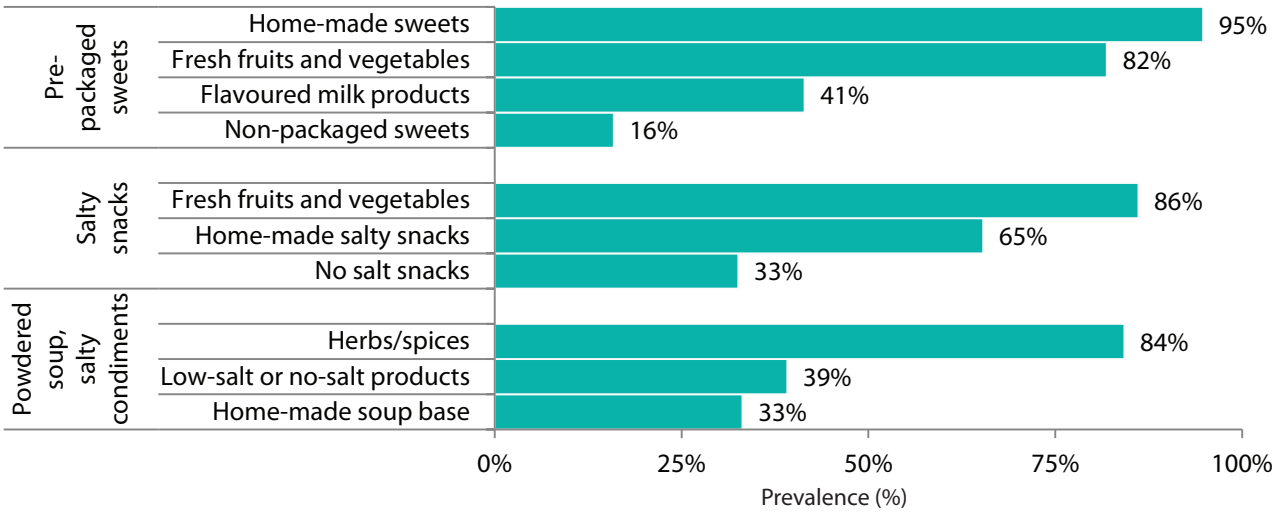
Most people who substituted PHPT products chose healthier options (Fig. 4). The majority (63%) substituted energy drinks with mineral water or coffee, while 55% chose tea; however, 52% replaced energy drinks by sugar-sweetened soft drinks. The most frequent substitute for sugar-sweetened soft drinks was mineral water or tap water, while nearly 40% prepared home-made lemonade, syrup or fruit juice with a high fruit content. Less frequent substitutes included low-calorie soft drinks and commercially available syrups.

Fig. 4. Proportions of people who substituted PHPT products with other products as a proportion of all substitutes, 2014



Pre-packaged sweets were replaced mainly by home-made sweets (Fig. 5), while 82% chose fresh fruits and vegetables and 41% chose flavoured dairy products as healthy alternatives. Cheaper, non-packaged sweets were less frequent alternatives (16%). Of the people who substituted salty snacks, 86% changed to fresh fruit and vegetables, while 65% prepared home-made salty snacks; only one third of them used non-salty snacks as substitutes. Most people (84%) replaced powdered soup and salty condiments by green herbs and spices. Considerable proportions changed to products with a reduced salt content (39%) and home-made soups (33%).

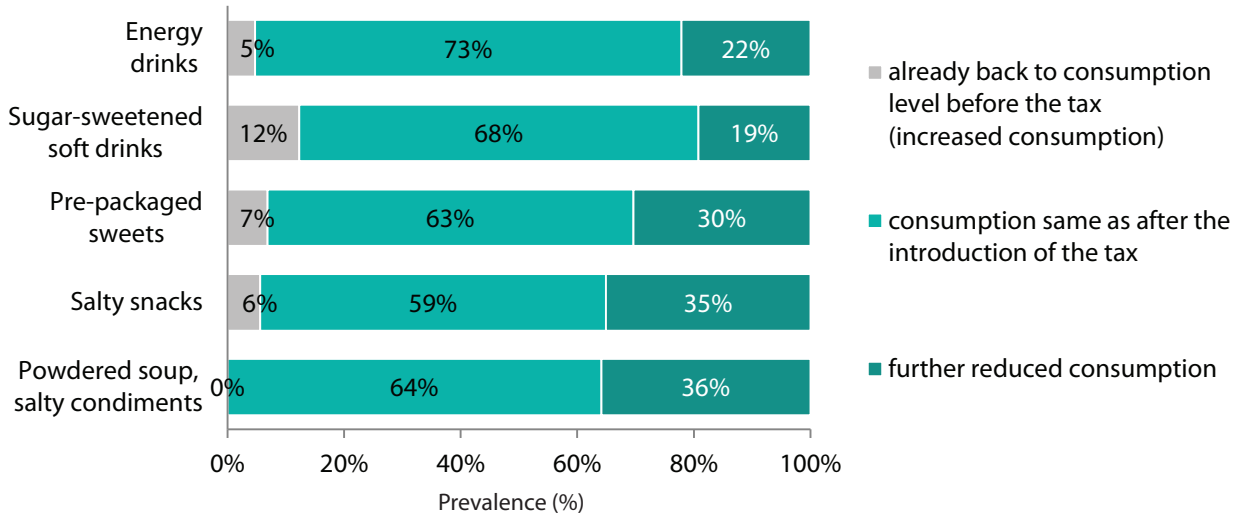
Fig. 5. Proportions of people who substituted PHPT products relative to all substitutes, 2014



4.5 Current consumption habits

Most people (59–73%) who changed their consumption habits after introduction of the PHPT maintained their behaviour, with similar reductions in consumption in 2014 (Fig. 6), and 19–36% further reduced their consumption of PHPT products. Only a small proportion (0–12%) increased their consumption after an initial reduction, so that their consumption was at the same level as before introduction of the tax.

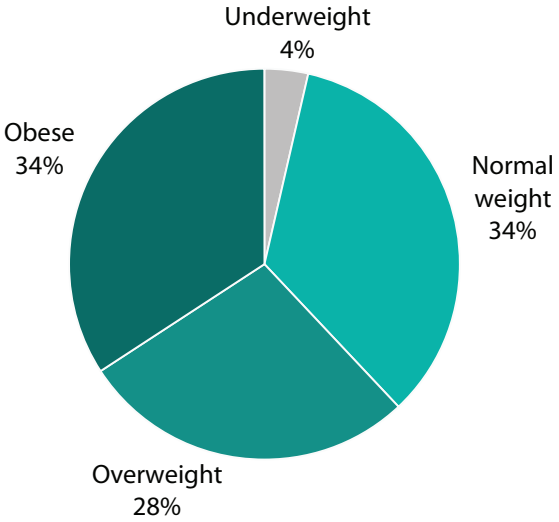
Fig. 6. Current consumption of people who had lowered their consumption, 2014



4.6 Impact on nutritional status of products with a public health tax

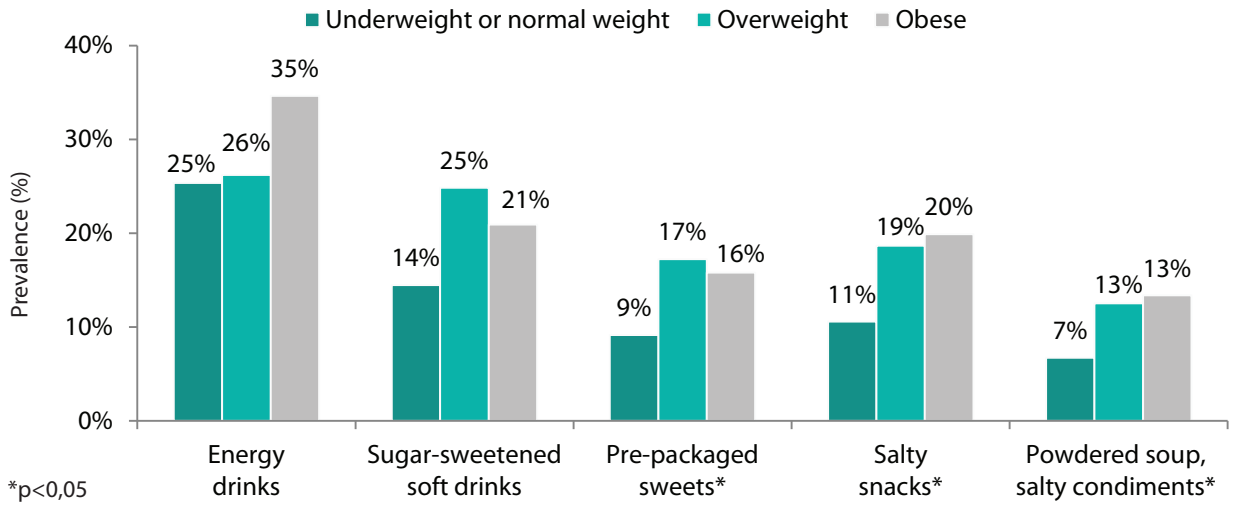
The OTÁP 2014 study provided information on the impact of the PHPT in groups with different diet-related risk factors, including obesity and overweight, which affect nearly two thirds of the adult population of Hungary (Fig. 7).

Fig. 7. Weight status of the Hungarian adult population, 2014



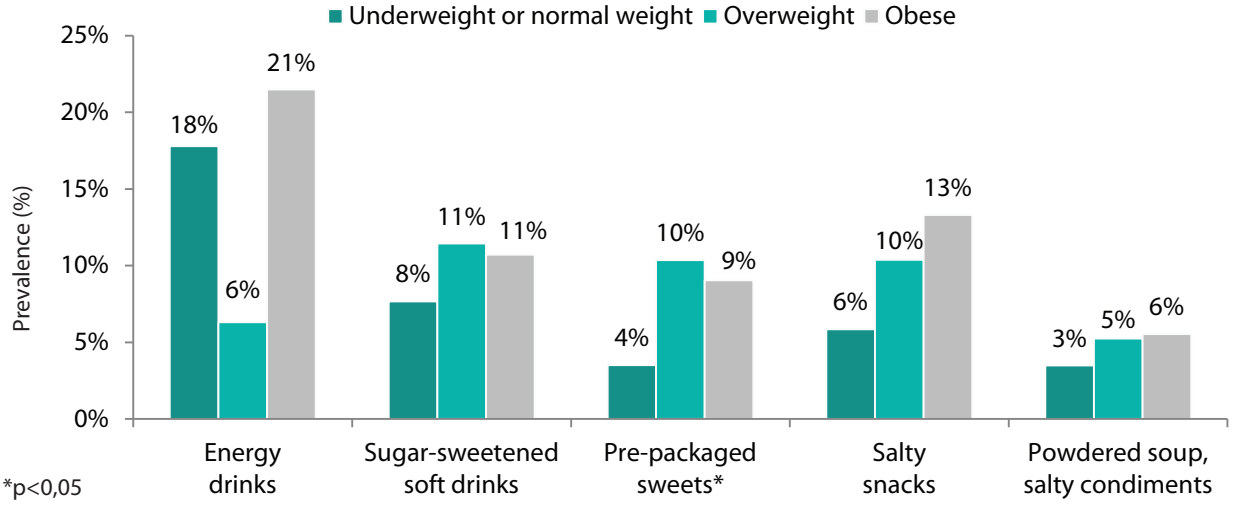
The proportions of people who changed their consumption differed significantly by weight category; thus, overweight and obese people were more likely to change their consumption (Fig. 8). Of people who drank energy drinks, only one fourth of those who were underweight or of normal weight and 35% of obese people changed their consumption. Among those who drank sugar-sweetened soft drinks, 14% of those who were underweight or of normal weight, 25% of those who were overweight and 20% of those who were obese changed their consumption. Of consumers of pre-packaged sweets, salty snacks and powdered soup, significantly more with a higher BMI changed their consumption than those in the underweight and normal categories.

Fig. 8. Proportions of people who changed their consumption, by weight category, 2014



The proportion of people who reduced their consumption of PHPT products also varied by weight category. Overweight and obese people were more likely to reduce their consumption of all product groups except energy drinks than underweight people or those with a normal BMI (Fig. 9). This association was significant for pre-packaged sweets.

Fig. 9. Proportions of people who reduced their consumption of PHPT products, by weight category, 2014

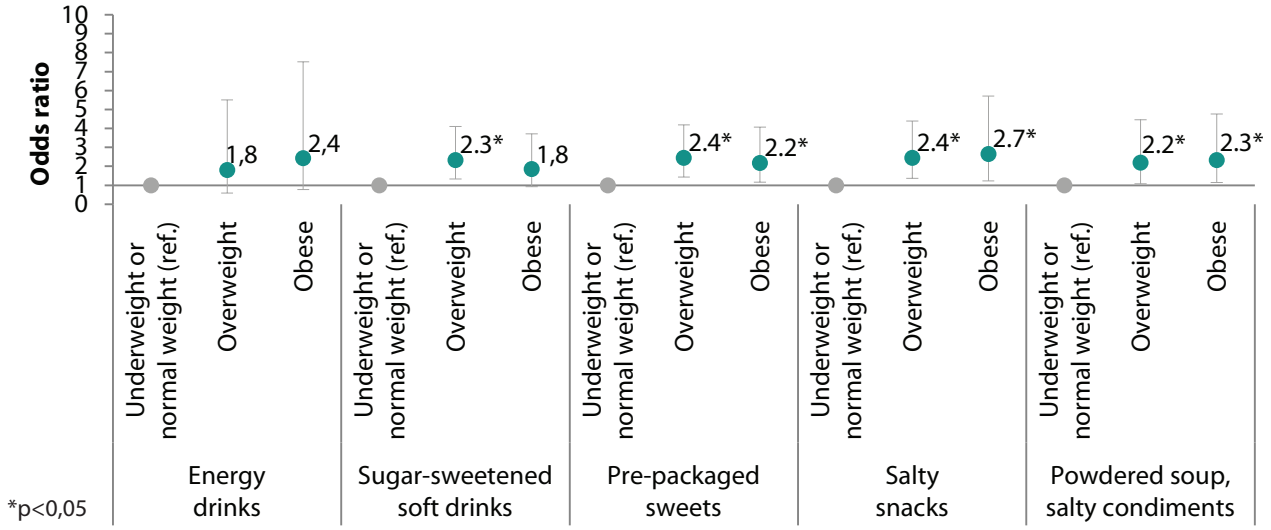


The consumption of different products and changes in consumption habits were strongly associated with age and sex. Energy drinks are a good example, as the majority of consumers are young people. We therefore used multivariate regression to analyse behaviour change. The model described in Annex 1 allows simultaneous analysis of the independent effects of several determinants and indicates whether weight affects changes in consumption independently of age and sex.

Weight was strongly associated, independently of age and sex, with changing consumption of sugar-sweetened soft drinks, pre-packaged sweets, salty snacks and powdered soups or salty condiments (Fig. 10). We conclude that overweight and obese people who consume PHPT products were 1.8–2.7 times more likely to change their

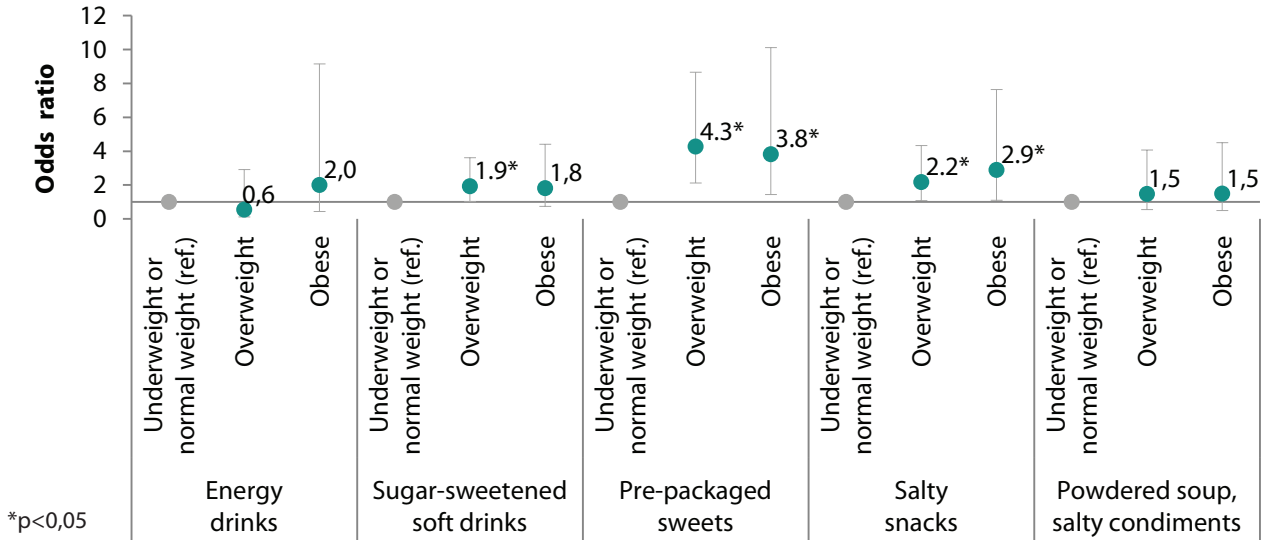
consumption after introduction of the law than people who were underweight or of normal weight. Although the association was not statistically significant for energy drinks, people who were overweight or obese were more likely (OR, 1.8 and 2.4, respectively) to change their behaviour than the underweight or normal weight category.

Fig. 10. Associations between change in consumption behaviour and weight category, 2014



One of the most important changes in consumption is a reduction. Reduced consumption was significantly associated with the weight category of consumers of sugar-sweetened soft drinks, pre-packaged sweets and salty snacks (Fig. 11). For sugar-sweetened soft drinks, overweight and obese people were 1.9 times more likely than consumers in the underweight or normal weight category to reduce their consumption after introduction of the PHPT. Of people who consumed pre-packaged sweets, those who were overweight were 4.3 times and those who were obese were 3.8 times more likely to lower their consumption. Overweight and obese adults were 2.2 and 2.9 times more likely, respectively, to consume less salty snacks.

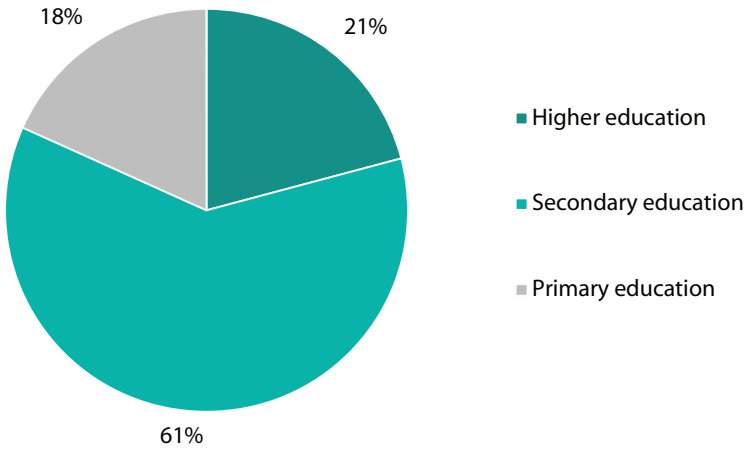
Fig. 11. Associations between reduced consumption and weight category, 2014



4.7 Socioeconomic status and products with public health taxes

One of the main questions addressed by the impact assessment was whether consumption of PHPT products is associated with socioeconomic status. We chose education as an indicator of socioeconomic status, because this is internationally accepted proxy and we had comprehensive data on education. Furthermore, in Hungary, education accounts for most income inequality.[8, 9] In our study, 18% of adults had primary education, 61% had secondary education, and 21% had higher education (Fig. 12).

Fig. 12. Distribution of adult population by educational level, 2014



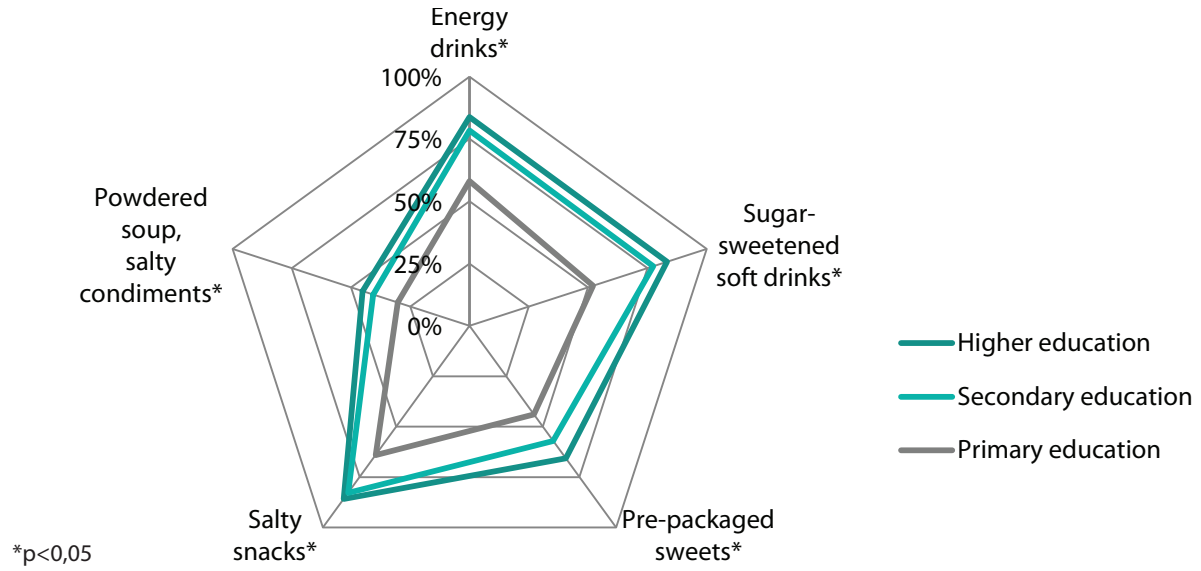
4.7.1 Awareness about the PHPT and about PHPT products by educational level

Although 90% of the adult population had heard about the PHPT, the proportion differed according to educational attainment: 72% of adults with primary education, 93% with secondary education and 97% with higher education knew about introduction of the PHPT ($P < 0.05$). Awareness about PHPT products also differed significantly by educational level, people with primary education being less aware. Significantly fewer people (30–64%) with primary education than those with higher education (45–86%) knew that PHPT is levied on energy drinks, sugar-sweetened soft drinks, pre-packaged sweets, salty snacks and powdered soup or salty condiments (Fig. 13). Furthermore, significantly more people with only primary education did not know whether a particular product was taxed (28–43%, depending on the product type).

[8] Szivós P, Toth IG, editors. Egyenlőtlenség és polarizálódás a magyar társadalomban. [Inequality and polarization of Hungarian society.] Tárki Monitoring Survey 2012. Budapest; 2013 (http://www.tarki.hu/hu/research/hm/monitor2012_teljes.pdf, accessed 11 November 2015).

[9] Tamás K, Toth IG, editors. Medgyesi Márton: a jövedelmek eloszlása az EU országaiban. [Martin Media. The distribution of income in the EU countries.] In: Social report 2008. Tárki. Budapest; 2008.

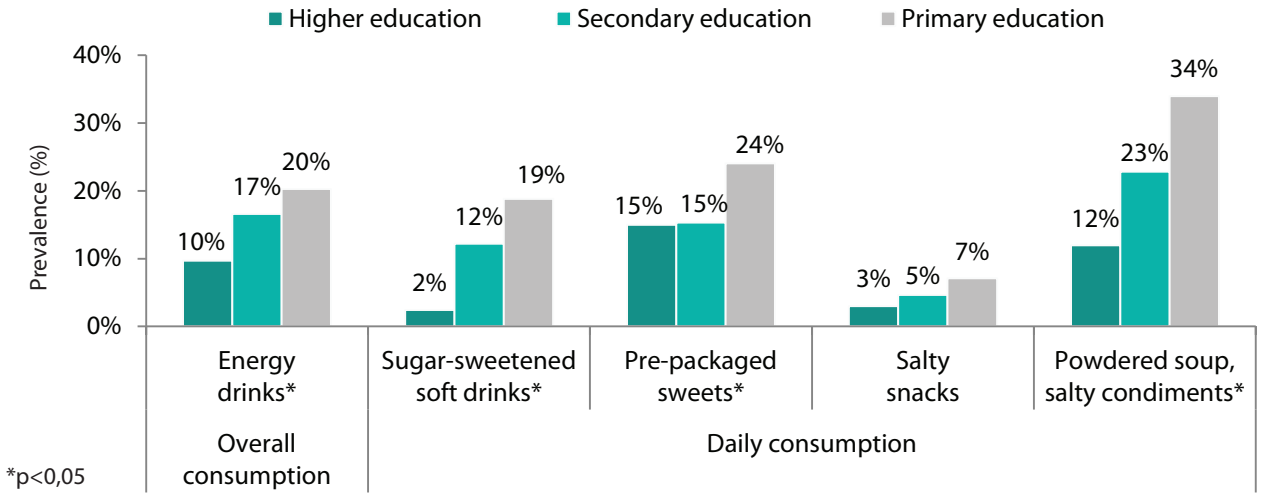
Fig. 13. Awareness about PHPT products according to educational level, 2014



4.7.2 Consumption of PHPT products according to educational level

We found a statistically significant difference in the consumption of PHPT products by educational attainment: 20% of adults with primary education and 10% of those with higher education consumed energy drinks (Fig. 14). The proportion of adults who consumed sugar-sweetened soft drinks, pre-packaged sweets, powdered soup and salty condiments daily was significantly higher among those with primary education than those with secondary or higher education. We found no difference in the consumption of salty snacks by educational attainment.

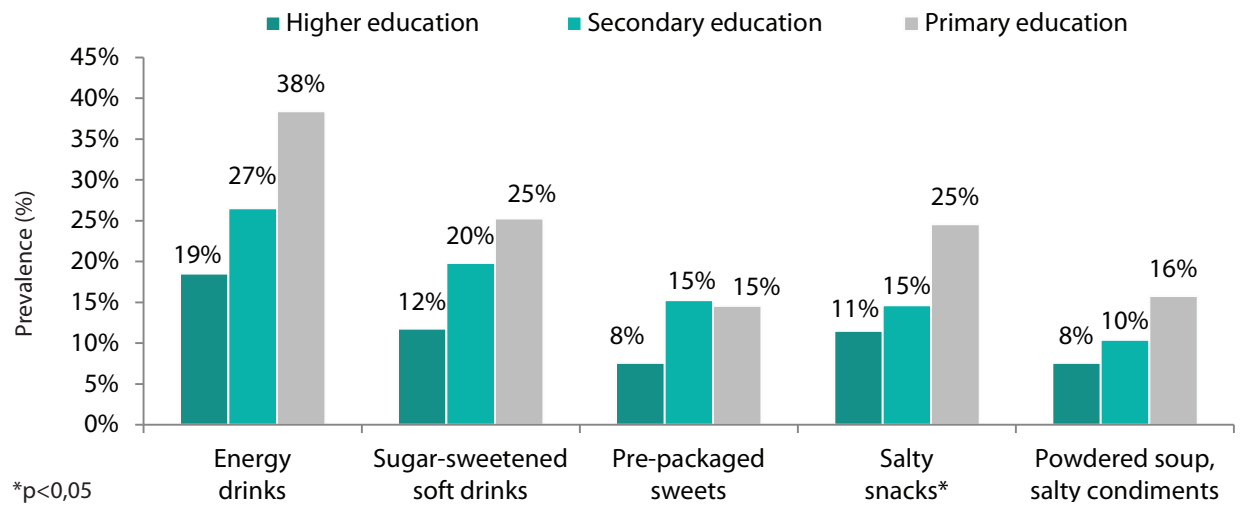
Fig. 14. Overall and daily consumption of PHPT products by educational level, 2014



4.7.3 Change in consumption according to educational level

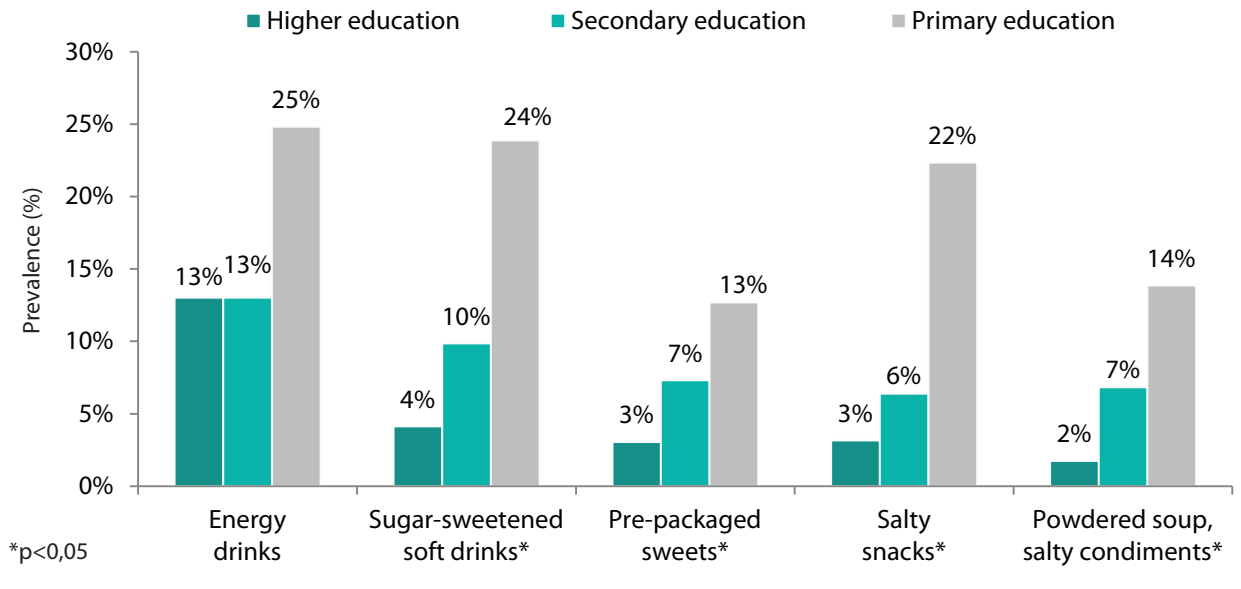
More PHPT product users with primary education changed their consumption of all product groups after introduction of the PHPT than those with higher education, but this tendency was statistically significant only for salty snacks (Fig. 15).

Fig. 15. Proportions of people who changed their consumption of PHPT products by educational level, 2014



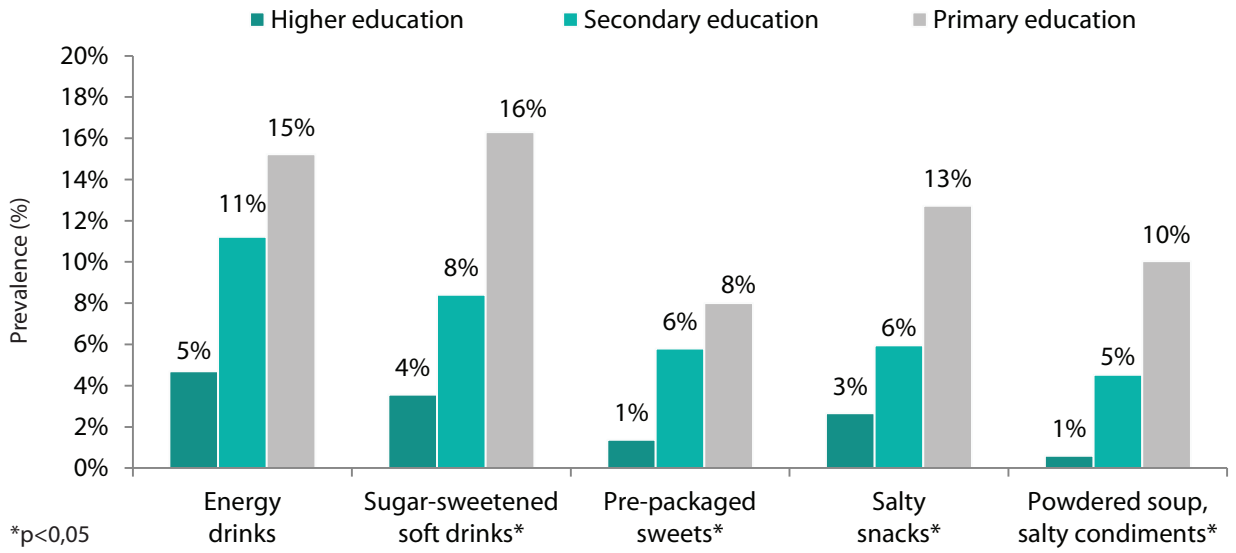
One of the effects of the PHPT was buying cheaper products (see Fig. 3); for each product group, a higher proportion of adults with primary education than those with a higher educational level chose cheaper products (Fig. 16). Among users of sugar-sweetened soft drinks, 24% of those with primary education and only 4% of those with higher education chose cheaper products; and these percentages were 13% and 3% for pre-packaged sweets, 22% and 3% for salty snacks and 14% and 2% for powdered soup and salty condiments, respectively. The differences by educational attainment were statistically significant, except for energy drinks.

Fig. 16. Proportions of people who bought cheaper products after introduction of the PHPT, by educational level, 2014



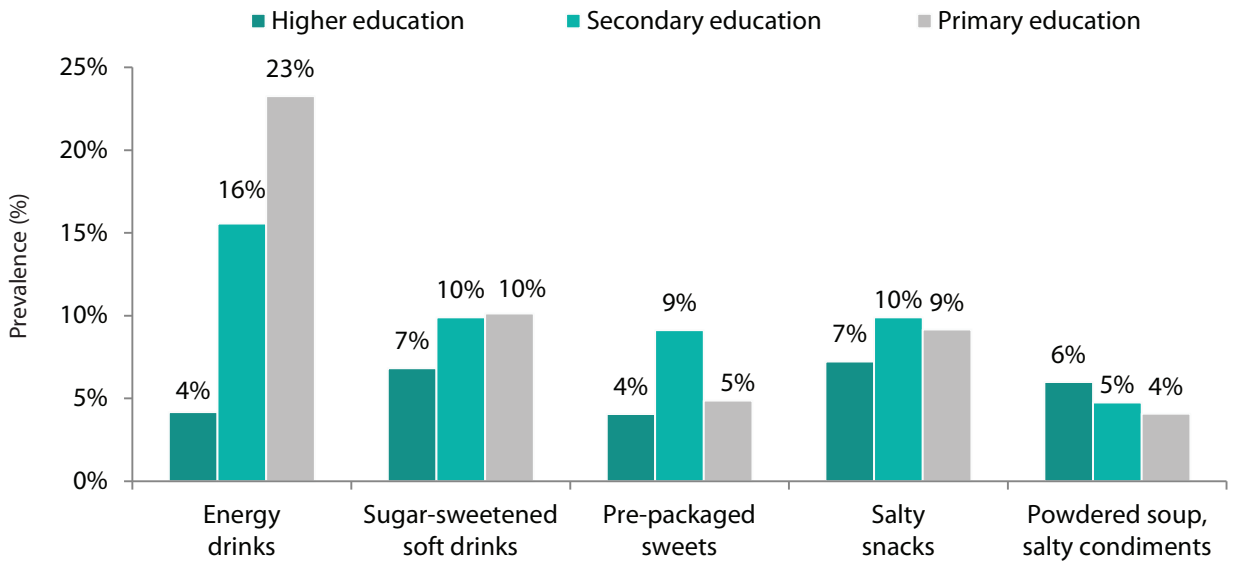
Changing to another brand is another form of consumption change. Significantly higher proportions of people with primary education (8–16%) than those with higher education (1–5%) chose another brand of each product after introduction of the PHPT (Fig. 17).

Fig. 17. Proportions of people who changed to another brand after introduction of the PHPT, by educational level, 2014



We found no statistically significant difference in proportions of people who reduced their consumption by educational level (Fig. 18).

Fig. 18. Proportions of people who reduced their consumption of specific product groups, by educational level, 2014



4.7.4 Reasons given for reducing consumption, by educational level

Price increase was more likely to be selected as the reason for reduced consumption by people with primary education (sugar-sweetened soft drinks: 85%, pre-packaged sweets: 100%, salty snacks: 87%) than by those with higher education; however, the increased likelihood was statistically significant only in the case of pre-packaged sweets. Of those who decreased their consumption of energy drinks because the product became more expensive, 58% had primary education, 70% had secondary education, and 100% had higher education. We found no association between educational level and consumption of powdered soup or salty condiments (Table 2).

Table 2. Reasons for reducing consumption, by educational level, 2014

Product	Price increase			Learnt that unhealthy		
	Higher education	Secondary education	Primary education	Higher education	Secondary education	Primary education
Energy drinks	100%	70%	58%	0%	55%	58%
Sugar-sweetened soft drinks	68%	37%	85%	35%	74%*	15%*
Pre-packaged sweets	34%*	67%	100%*	53%	49%	21%
Salty snacks	49%	53%	87%	43%	62%*	13%*
Powdered soup, salty condiments	56%	76%	56%	44%	40%	0%

*p<0,05

The proportion of people who lowered their consumption because they had learnt that a product was unhealthy also differed by educational level. Only 15% of those with primary education, 74% of those with secondary education and 35% of those with higher education claimed that they had reduced their consumption of sugar-sweetened soft drinks because they knew they were unhealthy. The proportion of adults with primary education was also significantly lower for salty snacks (13% as compared with 62%). We found similar results in the group with reduced consumption of pre-packaged sweets and powdered soup.

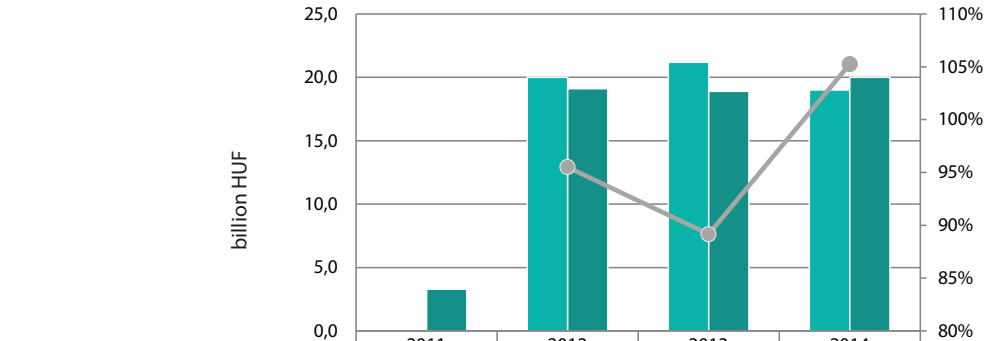
Table 2 shows that up to one fifth of people with primary education and higher proportions of people with higher education reduced their consumption of a product because they had learnt it was unhealthy. The differences in the results for energy drinks are probably due to small numbers of consumers.

5. Tax revenue

5.1 Realized tax revenue

A review of the annual estimated and realized amounts of the PHPT in the period 2011–2014 (Fig. 19) shows that, apart from the first year, when only HUF 3.3 billion were realized because the PHPT was introduced in September, nearly HUF 20 billion were paid into the State budget annually. The total revenue from the PHPT during these 4 years was HUF 61.3 billion (€200 million). There was no significant difference between the planned and the realized tax revenue, indicating that planning was based on a reliable method.

Fig. 19. Estimated and realized revenues from the PHPT, 2011–2014

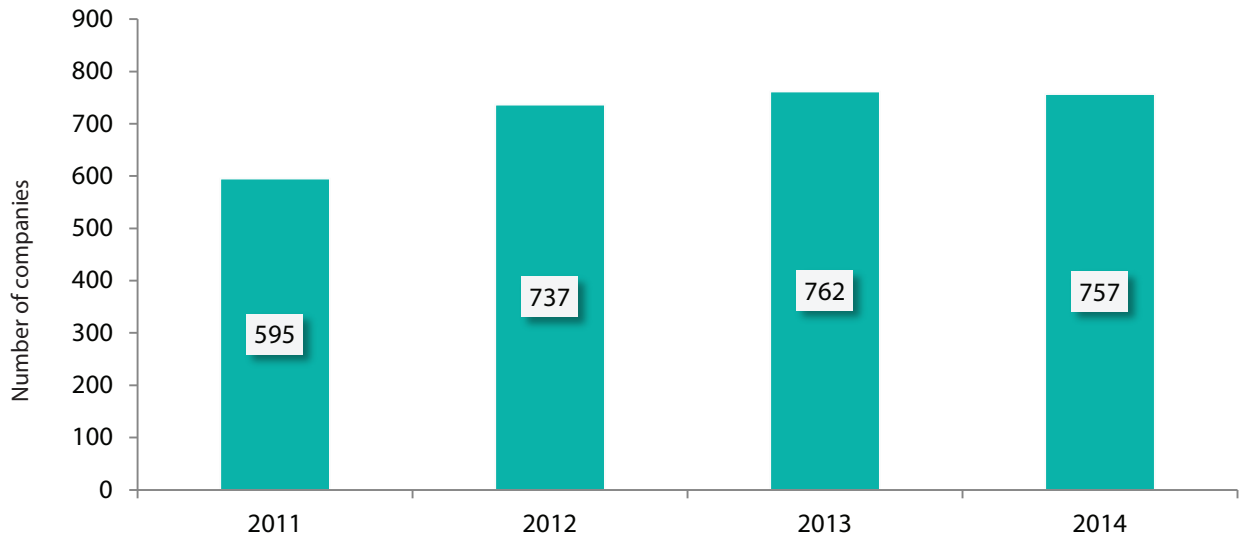


	2011	2012	2013	2014
estimated	0,0	20,0	21,2	19,0
realized	3,3	19,1	18,9	20,0
proportional realization of estimates (right axis %)		96%	89%	105%

5.2 Number of companies that pay public health taxes on products

The number of companies that submitted a PHPT return has been fairly stable since 2011. In 2012–2014, 737–762 enterprises filed a return (Fig. 20); fewer companies filed returns in 2011 because the law was introduced only in September. Furthermore, at that time the PHPT was applied to only five product groups; the number was increased in 2012. The PHPT affects only a small number of the 1.6–1.7 million companies registered in Hungary.

Fig. 20. Numbers of companies that filed a PHPT return, 2011–2014



The top 10 companies that pay the PHPT accounted for 50% of the revenue, and the top 50 companies for 90% of total PHPT revenue (Table 3). Consequently, the tax has little impact on the 700 predominantly small and medium-sized enterprises. The top 10 PHPT-paying companies are typically multinational retail chains with exceptionally high turnover.

Table 3. Proportions of total tax revenue paid by top tax-paying companies, 2011–2014

Category	2011	2012	2013	2014
Top 10	59.1%	55.1%	52.9%	52.7%
Top 35	84.0%	83.7%	82.3%	83.0%
Top 50	88.7%	88.5%	87.9%	88.1%

5.3 Realized tax by product group

Table 4 lists the product groups to which the PHPT is applied and the rate applicable to each group. The range of products has increased continuously since 2011, and, except on energy drinks and new product groups introduced in 2012, the tax rate has also increased.

Table 4. Products on which the PHPT is imposed and tax rates, 2011–2014

Product group	Tax rate			
	2011	2012	2013	2014
Sugar-sweetened cocoa powder (HUF/kg)	-	70	70	70
Energy drink 1 (HUF/L)*	250	250	250	250
Energy drink 2 (HUF/L)**	-	-	40	40
Condiments (HUF/kg)	200	250	250	250
Fruit jam (HUF/kg)	-	500	500	500
Flavoured beer and alcoholic beverages (HUF/L)	-	20	20	20
Salty snack (HUF/kg)	200	250	250	250
Soft drink (HUF/L)	5	7	7	7
Pre-packaged, sugar-sweetened product (HUF/kg)	100	130	130	130
Syrup (HUF/L)	-	200	200	200

* Contains methylxanthine at > 1 mg/100 mL and taurine at > 100 mg/100 mL ** Contains methylxanthine at > 15 mg/100 mL

Four product groups – pre-packaged sugar-sweetened products, salty snacks, soft drinks and condiments – account for 90% of the total revenue (Fig. 21). Pre-packaged sweetened products alone generated HUF 10 billion, i.e. more than half the total revenue in 2014.

Fig. 21. Breakdown of realized tax revenue by product group, 2014

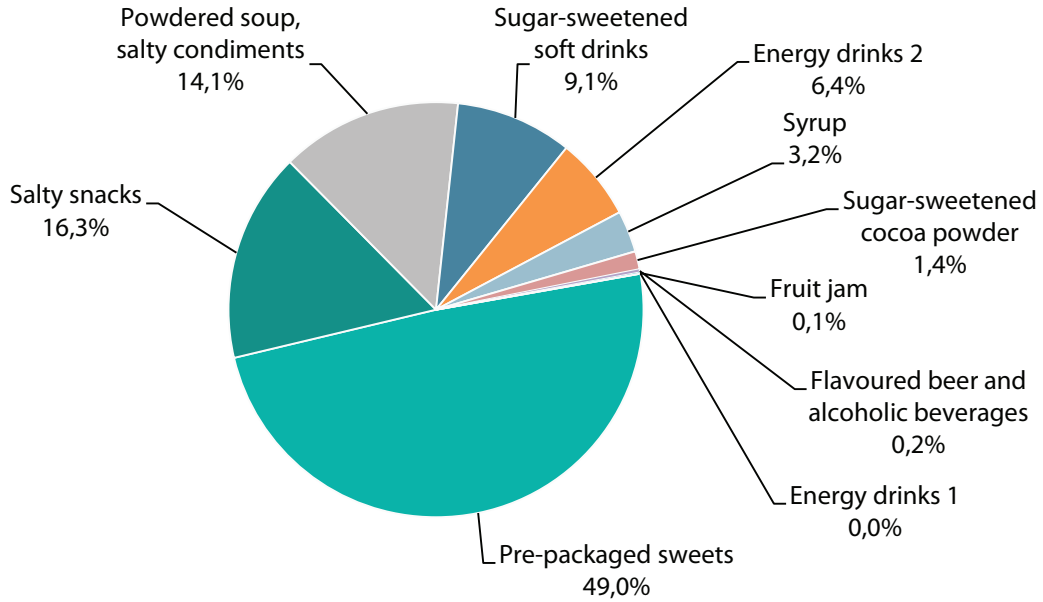


Table 5 shows the amount of PHPT by product group filed by companies between 2011 and 2014. The change in the energy drink category after it was divided into two groups in 2013 is notable, the amount of filed tax having changed from HUF 0.17 billion in 2012 to HUF 1.32 billion in 2013.

Table 5. Amount of tax filed (HUF billion) by product group, 2011–2014

Product group	2011	2012	2013	2014
Sugar-sweetened cocoa powder	-	0.31	0.33	0.29
Energy drink 1	0.15	0.17	0.02	0.00
Energy drink 2	-	-	0.95	1.32
Condiments	0.56	3.10	2.96	2.89
Fruit jams	-	0.10	0.03	0.02
Flavoured beer and alcoholic beverages	-	0.18	0.07	0.05
Salty snacks	0.87	3.35	3.17	3.34
Soft drinks	0.59	2.29	1.92	1.86
Pre-packaged sugar-sweetened products	2.48	10.00	9.86	10.04
Syrups	-	0.04	0.03	0.66
Total	4.65	19.54	19.34	20.47

The difference between the filed taxes and the realized revenues in Fig. 19 is due to the approximately 1 month difference between the date of filing and actual payment of the tax.

Table 6 shows the trend in filed taxes by product group between 2011 and 2014, which forms the tax base. As for filed tax amounts, energy drinks was the top category: 660 000 L of energy drinks were sold in 2012 and 33 000 000 L in 2014.

Table 6. Trends in amounts filed, forming the tax base, 2011–2014				
Product group	2011	2012	2013	2014
Sugar-sweetened cocoa powder (kg)	-	4 391 600	4 677 672	4 205 842
Energy drink 1 (L)	599 684	660 426	112 607	19 105
Energy drink 2 (L)	-	-	24 896 399	33 137 681
Condiments (kg)	3 117 565	12 416 967	11 847 756	11 547 067
Fruit jams (kg)		207 833	57 279	47 777
Flavoured beer and alcoholic beverages (L)	-	8 788 433	3 718 731	2 744 437
Salty snacks (kg)	4 354 347	13 383 069	12 696 699	13 368 540
Soft drinks (L)	117 760 575	327 181 610	273 962 661	266 861 137
Pre-packaged sugar-sweetened products (kg)	24 897 550	76 945 121	76 024 252	77 453 943
Syrups (L)		190 369	160 857	3 318 625

5.4 Use of revenue from public health taxes on products

After introduction of the PHPT in 2011, a total of HUF 61.3 billion (€200 million) had been generated by December 2014. Since 2012, PHPT revenue has been assigned a separate budget line in the health insurance fund (health care budget).

The revenue was used to increase wages in the health sector in two stages, in 2012 and 2013. The wage increases applied to public servants, employees and workers in health service providers owned by the State, local governments, the church or a higher education institute and other workers in the health sector. Nearly 95 000 workers have benefited from the wage increases:

- 17 500 physicians and specialists,
- 75 800 specialized health professionals,
- 1200 other health care professionals and
- 400 institutional pharmacists.

With the increases in 2012, health sector wages rose on average by 17.6%. In the second stage, in 2013, health sector wages increased by a further 8.2%.

6. Summary

The second impact assessment, conducted with the support of the WHO Regional Office for Europe, indicates that 16–28% of consumers of PHPT products (depending on the product group) changed their consumption habits due to introduction of the tax.

The impact of the PHPT has thus been sustained by the majority (59–73%) of those who reduced their consumption. Moreover, 19–36% reduced their consumption even further. Higher prices and awareness that the products are unhealthy were similarly important reasons for reduced consumption; for sugar-sweetened soft drinks, awareness that they are unhealthy was more relevant than the price increase. This is a substantial difference from the first impact assessment, in which price increase was given as the main reason for reducing consumption.
This may be due to several factors. Consumers may have become accustomed to higher prices, and it is possible that the additional price increase was not so great, as retail companies or manufacturers may have partially assumed the price rise after introduction of the PHPT. Recent intensive health promotion campaigns related to

other legislation (such as the law on healthy public catering) may have raised awareness in the population about diet-related health risks. *The conclusion that the health literacy of the Hungarian adult population has improved is supported by the finding that more chose healthy alternatives as substitutes for PHPT products.*

Two thirds of the Hungarian adult population are either overweight or obese according to the OTÁP 2014. An important result from the public health point of view is that weight category strongly influenced changes in consumption. Overweight and obese individuals were twice as likely to change their consumption behaviour as those who were underweight or of normal weight. Overweight and obese people were also more likely to reduce their consumption of each product group – by four times for pre-packaged sweets.

Socioeconomic status strongly influenced changes in consumption. Twice as many people with primary education as with higher education changed their consumption to another brand of the product or a cheaper alternative. Educational level did not affect reductions in consumption, and people with primary education did not demonstrate improved health literacy. The proportion of people who consumed PHPT products daily was much higher among those with primary education than those with higher education, and the difference was ninefold for sugary soft drinks. Awareness about the PHPT and the taxed products also differed by educational attainment, those with only primary education being less likely to be aware.

The economic analysis showed virtually similar planned and realized tax revenue. The top 50 tax-paying companies paid 90% of the total PHPT. Both the tax rate and the list of products covered by the law have changed several times, resulting in a substantial increase in revenue from the tax on energy drinks, although it did not affect the total annual tax revenue of HUF 20 billion.

Each year, half the total PHPT revenue was from tax paid on pre-packaged sweets, and tax paid on salty snacks, soft drinks and condiments made up another 40% of the total annual revenue. The distribution of commercial quantities differed, sugar-sweetened soft drinks representing two thirds, pre-packaged sugary sweets 19% and energy drinks 8%. Salty snacks and powdered soups and salty condiments contributed 3% each to the commercial turnover of PHPT products.

The revenue from the PHPT has been used to increase the wages of 95 000 health care workers.

Unfortunately, we did not have access to time series commercial data, apart from the amount of taxed products, or data on the retail prices of PHPT products, which limited the scope of the impact assessment. We based our analysis on data from a study by Ecorys, a policy research and consulting firm that provides technical assistance and capacity-building,[10] which in many cases differ from the data provided by manufacturers for the first impact assessment.

We conclude that the PHPT has achieved its public health goals in the long term. Consumption of the taxed products has decreased, and the effect has mainly been sustained. More than two thirds of people who chose a different product changed to a healthier alternative. As two thirds of Hungarian adults are overweight or obese, it is an important public health achievement that they were much more likely to reduce their consumption of the taxed products. The health literacy of the population has improved, although this was not a strong reason for people with primary education to reduce consumption. More people with primary education than those with higher educational attainment changed to cheaper products, but we do not know whether the cheaper products

[10] Food taxes and their impact on competitiveness in the agri-food sector. Final report. Rotterdam: Ecorys; 2014 (Ares(2014)2365745–16/07/2014).

were healthier. The PHPT has also achieved its economic goals, the projected revenue having been realized each year, making it possible to increase the wages of health sector workers by 25% in two stages.

Recommendations: Targeted initiatives to improve health literacy and other policies should extend the impact of the food tax to other population groups, including those with a lower educational level. In order to reach these groups, local, targeted awareness-raising and educational programmes and complementary measures should be planned. Consideration should also be given to introducing targeted price subsidies for healthy food products such as fruit and vegetables. It is highly recommended that the rate of the PHPT on certain products, such as sugar-sweetened soft drinks, be increased. The additional revenue could cover public health programmes, targeted health education and other nutrition- and physical activity-related interventions. It will be important to continue to monitor and evaluate the impact of the PHPT.

Annex 1

A1. Population survey

The population survey was conducted between September and December 2014 as part of the National Diet and Nutritional Status Survey 2014 (OTÁP 2014) of the National Institute for Food and Nutrition Science. The OTÁP 2014 was part of the European health interview survey 2014 in Hungary conducted by the Hungarian Central Statistical Office.

The sample for the European health interview survey 2014 in Hungary was selected by a two-step, stratified method. The sample size was 10 000 people in 532 settlements. The OTÁP 2014 study was conducted with a subsample of the European health interview survey, representing the population aged 18 years and older on 31 December 2014 living (not institutionalized) in Hungary. The subsample consisted of 3175 people in 122 settlements (23 districts of Budapest, 23 cities at county level and 76 settlements).

The OTÁP 2014 was conducted with 883 participants in the European health interview survey who completed the survey, received detailed information and gave their consent to participate. The participants in the OTÁP 2014 kept a 3-day nutrition diary, and anthropometrics were recorded. Their height was measured on a portable SECA 2014 scale, their weight on a SECA 872 digital scale and their waist circumference on a SECA 201 circumference scale by skilled health workers. The questionnaire was administered in face-to-face interviews.

A2. Methods used in the impact assessments

Table A1 shows the methods used in the first and second impact assessments.

Table A1. Methods used in impact assessments in 2012 and 2014

1. Population survey		
Method	**Data collection:** Face-to-face interviews by professional interviewers **Period:** September–October 2012 **Institute:** Ipsos Media, Advertising, Market and Opinion Research Zrt. omnibus study **Sampling frame:** Population aged 18 years and over **Planned sample:** 1000 people	**Data collection:** Face-to-face interviews by health care professionals as part of OTÁP2014 **Period:** September–December 2014 **Institute:** National Institute for Food and Nutrition Science **Examiners:** Health care professionals **Sampling frame:** Population aged 18 years and over **Planned sample:** 3300 people
Questionnaire items	• Frequency of consumption (never, monthly, weekly or daily) • Motivation for buying (price, brand, taste) • Change in consumption in past year (more, same, less) • Reason for consuming less (price increase, unhealthy, other people's opinion, illness, doctor's opinion) • Knowledge about PHPT; why it was introduced, agree with objectives • Knowledge about PHPT products • Price increase due to PHPT • Should PHPT be changed? If yes, how?	• Frequency of consumption (never, monthly, weekly or daily) • *Change in consumption after PHPT (consumed cheaper or other brand, less or more, substituted)* • Reason for consuming less (price increase, unhealthy, other people's opinion, illness, doctor's opinion) • *Present consumption (decreased further, same, increased)* • *Substitution* • Knowledge about PHPT • Knowledge about PHPT products
Background variables	• Education • Economic activity • Subjective health status	• Education • Economic activity • Subjective health status • Income • *Nutritional status (weight, height, waist circumference)* • *Dietary habits* • *Health status (diet-related illnesses diagnosed by doctor)*
Dietary habits	-	• *Quantities of some PHPT products consumed*
2. Economic analysis		
Method	Identification of companies paying 80–90% of PHPT tax Data downloaded from company information Electronic company registry of Ministry of Public Administration and Justice **Analysis:** 35 companies	Analysis of data on PHPT taxpayers (data from National Tax and Customs Administration)
Topics	• Net retail income • Personnel expenses • Net profit • Average number of statistical staff	• Taxes paid • Amounts forming tax base • Top tax-paying companies • Trends in 2011–2014
3. Company survey		
Method	**Data collection:** Online questionnaire **Study period:** 19 November–10 December 2012 **Frame:** Companies thought to pay PHPT September 2011–August 2012 (500 e-mails) **Realized sample:** 69 companies	-
Questionnaire items	• PHPT products • Reformulation, substitution • Influence of PHPT on product price • Turnover, marketing, change in business policy • Postponed or cancelled investments	-

A3. Quality assurance

In order to ensure data validity, we planned and documented the study implementation procedures and steps in detail and monitored and supervised everyone who participated.

During preparation of the European health interview survey 2014, the regional organizers at the Central Statistical Office received training in the objectives of OTÁP 2014, implementation and their tasks. The regional trainers then trained interviewers working under their supervision. The health care staff who conducted the OTÁP 2014 study participated in 1 day of training in which they had theoretical and practical instruction in the objectives of the study, the measuring equipment, taking measurements, filling in the nutrition diary and use of a pedometer.

The nutrition diaries and data sheets were reviewed by nutritionists, coordinated by the National Association of Hungarian Nutritionists. The anthropometrics and face-to-face interviews were conducted by nurses and specialist nurses, coordinated by the Chamber of Hungarian Health Care Professionals.

The National Institute for Food and Nutrition Science conducted telephone checks with a randomly selected group of 10% of participants to establish that an interview had taken place and that the information received from the interviewers at the Central Statistical Office was adequate.

A4. Analysis

In analysing survey data, the sampling design must be taken into account, including the differential probability of being selected into the sample, grouping and stratified design. To analyse the data from OTÁP 2014, we used the survey module of STATA software, which includes consideration of the characteristics of the sampling design used. The OTÁP 2014 sampling weights were age, sex and settlement size, and the primary sampling unit was the settlement.

We estimated the prevalence and 95% confidence intervals of all indicators. For certain outcome and explanatory variables, we conducted multivariate regression analyses to identify the variables that most clearly differentiated categories of the outcome variable, taking into account a combination of background variables and measuring their independent effects, resulting in odds ratios and their 95% confidence intervals.

A5. Method for the economic analysis

The National Tax and Customs Administration provided aggregated PHPT revenues for the period 2011–2014. We received monthly and annual data on quantities of product groups submitted to the tax administration, the amount of tax and the number of companies that filed tax returns. We received aggregated data on the number of companies by the amount of tax paid and the frequency of filing returns.

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