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Not as bad as you think: a comparison of the nutrient content of best price and brand name food products in Switzerland

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ABSTRACT

Several studies have shown that low-cost foods have an equivalent nutrient composition compared to high-cost foods, but such information is lacking in Switzerland. Thus, we compared the caloric and nutrient content of "best price" (BPF) and brand name foods (BNF) in Switzerland using the version 5.0 (April 2015) of the Swiss Food and Nutrient composition database.

Over 4000 processed food items were included and 26 food categories were compared regarding total energy, protein, fat and carbohydrates, saturated fatty acids, sugar, fiber and sodium.

BPF, namely core food categories like Bread, Red meat, White meat and Fish products, were 42%, 39%, 42% and 46% less expensive than their BNF equivalents, respectively. No differences were found between BPF and BNF regarding total energy and protein, fat and carbohydrates for most food categories. In the Cheese category, BPF had a lower caloric content than BNF [Median (interquartile range, IQR): 307 (249–355) vs. 365 (308–395) kcal/100 g, respectively, $p < 0.001$]; BPF also had lower fat and saturated fatty acid content but higher carbohydrate content than BNF (both $p < 0.01$). In the Creams and puddings group, BPF had lower fat 1.3 (0.9–1.7) vs. 6.0 (3.5–11.0) g/100 g and saturated fatty acid 0.6 (0.6–0.8) vs. 2.9 (2.3–6.0) g/100 g content than BNF (both $p < 0.005$). In the Tinned fruits and vegetables group, BPF had lower sodium content than BNF: 175 (0–330) vs. 370 (150–600) mg/100 g, $p = 0.006$.

BPF might be a reasonable and eventually healthier alternative of BNF for economically deprived people in Switzerland.

1. Introduction

Diet is paramount for maintenance of health and prevention of most chronic diseases (World Health Organization, 1990). Several studies have reported that healthy, nutrient-rich foods such as fruits and vegetables are more expensive than energy-dense foods with low nutrient content (Drewnowski, 2010; Drewnowski and Specter, 2004; Temple and Steyn, 2011). Indeed, among economically deprived people, high price of foods is the most important barrier to a healthy diet, and two randomized controlled trials have shown that lower pricing strategies are consistently more effective than education for improving dietary habits (Ni Mhurchu et al., 2010; Waterlander et al., 2013).

Several studies conducted in Australia, the United Kingdom and France have shown that low-cost (budget) foods have an equivalent nutrient composition compared to high-cost (branded) foods (Chapman et al., 2013; Cooper and Nelson, 2003; Darmon et al., 2009). Thus, budget foods might be more cost-effective than branded foods regarding macro- and micronutrient contents. Although budget foods are increasingly popular among consumers (Waterlander et al., 2014), it remains a common belief that budget foods are nutritionally inferior to branded equivalents; in France, over one third (36%) of consumers think in this manner (Darmon et al., 2009).

Switzerland is one of the wealthiest countries worldwide. Still, over half of its population considers that healthy eating is expensive (Lieberherr et al., 2010). In Switzerland, two major supermarket chains represent 70% of the retail food market (Stephens, 2010), and both chains offer BPF. In almost all food categories there is a "best price" food (BPF)[1] with emphasis on lower price. These BPF might represent an interesting alternative to brand name foods (BNF)[2] for more economically deprived people. Previous studies have shown that the compliance to nutritional guidelines is low in the Swiss population. Low cost fruit and vegetable juices could be an interesting alternative to fruit and similarly, low-cost cheese and yogurts could help increase the very low percentage of the population complying with guidelines regarding dairy

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[1] BPF, best price food
[2] BNF, brand name food

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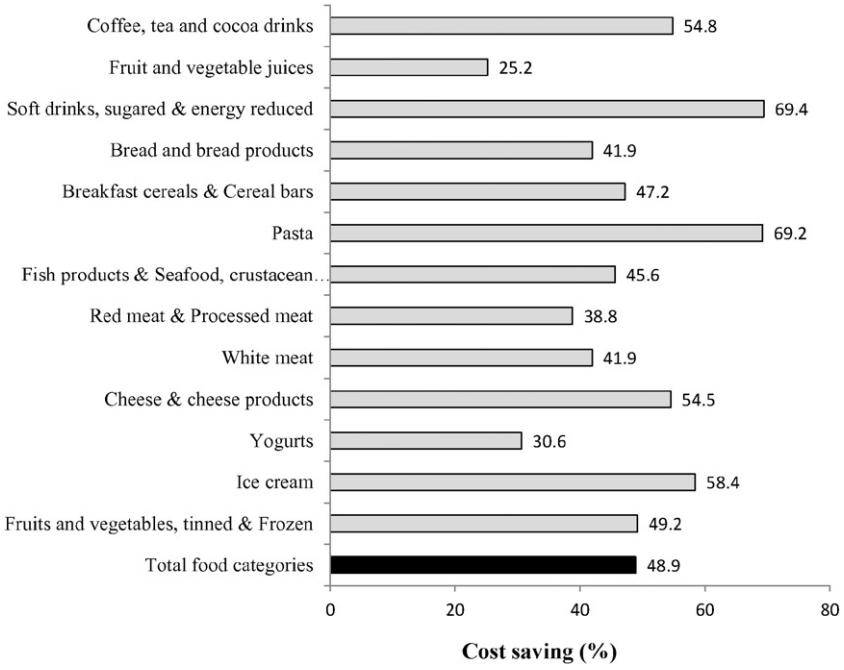

Fig. 1. Percentage cost saving between brand name food (BNF) and best price food (BPF) groups in Switzerland, as of May 2015.

products. Finally, the low cost bread and bread products, as well as breakfast cereals, could help increasing the low fiber consumption of the Swiss population. However, the information regarding the nutritional content of BPF and BNF is lacking in Switzerland. So, the present study aimed to compare the nutritional content of BPF with their BNF equivalent in Switzerland.

2. Material and methods

The version 5.0 of the Swiss Food and Nutrient composition database was used for analysis. The database can be downloaded free of charge from www.valeursnutritives.ch. It includes data for 7076 food items, 5040 (71.2%) of which from the two main supermarkets chains.

2.1. Cost of foods

For all food categories, the cost of foods was collected in May 2015 from the online store of the two main supermarket chains and expressed as Swiss Francs (CHF) per kg or per liter (1 CHF = 0.9595€ or 1.0712US$, values as of 22 May 2015). To calculate cost saving percentage, the price difference between mean BNF and BPF price were divided by mean BNF price, then multiplied by 100.

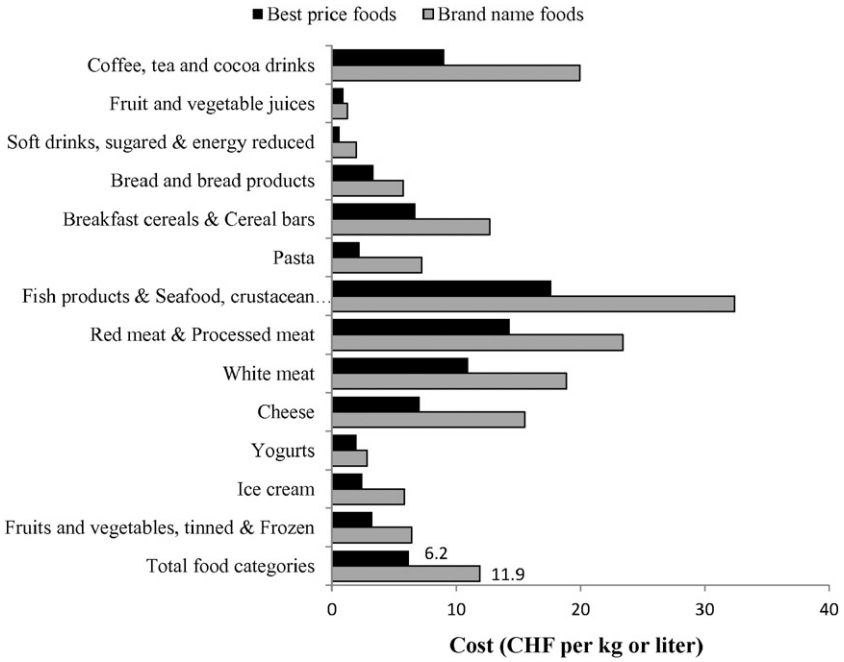

Fig. 2. Mean cost difference between brand name food (BNF) and best price food (BPF) groups in Switzerland, as of May 2015.

Table 1
Energy and macronutrient composition of BNF and BPF groups from the two main supermarket chains in Switzerland, stratified by 26 different food categories, according to the Swiss food composition database version 5.0 as of April 2015.

Food categories	Energy (kcal/100 g or 100 mL)		Fat (g/100 g or 100 mL)		Protein (g/100 g or 100 mL)		Carbohydrates (g/100 g or 100 mL)	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Coffee, tea and cocoa drinks								
BNF (n = 36)	73	[41–311]	1.9	[0.5–3.0]	3.5	[1.3–5.0]	10	[8–65]
BPF (n = 2)	211	[39–383]	2.3	[1.5–3.0]	3.0	[1.0–5.0]	43	[5–81]
P-value	0.870		0.646		1.000		0.974	
Fruit and vegetable juices								
BNF (n = 55)	52	[48–56]	1	[0–1]	0.5	[0.5–0.6]	11.0	[11–13]
BPF (n = 3)	52	[34–52]	1	[1–1]	0.5	[0.5–0.7]	11.0	[6.5–11]
P-value	0.480		0.344		0.826		0.185	
Soft drinks, energy reduced								
BNF (n = 17)	8	[1–16]	0.0	[0–0.5]	0.1	[0–0.5]	2.0	[0.1–4.0]
BPF (n = 6)	2	[0–4]	0.0	[0–0]	0.0	[0–0]	0.5	[0–1.0]
P-value	0.138		0.404		0.096		0.138	
Soft drinks, sugared								
BNF (n = 99)	36	[28–44]	0.0	[0–0.5]	0.0	[0–0.5]	8.0	[7–10]
BPF (n = 10)	39	[24–43]	0.0	[0–0.5]	0.3	[0–0.5]	8.0	[6–10]
P-value	0.975		0.931		0.743		0.728	
Bread and bread products								
BNF (n = 341)	274	[254–302]	3.5	[1.5–7.0]	10	[9–11]	48	[44–51]
BPF (n = 6)	255	[250–287]	3.3	[0.9–6.0]	10	[10–10]	48	[47–49]
P-value	0.446		0.429		0.907		0.758	
Breakfast cereals								
BNF (n = 39)	390	[371–436]	8.0	[2.5–14.0]	8.0	[8.0–11.0]	66.0	[61.0–74.0]
BPF (n = 4)	415	[406–428]	9.5	[7.5–11.5]	8.8	[8.3–9.0]	71.5	[69.5–73.5]
P-value	0.316		0.572		0.932		0.160	
Cereal bars								
BNF (n = 29)	451	[411–471]	17.0	[12–21]	8.0	[7.0–11.0]	61.0	[56–66]
BPF (n = 2)	420	[412–427]	13.0	[11–15]	10.5	[9.0–12.0]	63.0	[59–67]
P-value	0.421		0.276		0.395		0.717	
Pasta (warm dishes)								
BNF (n = 58)	230	[204–281]	6.0	[4.5–8]	9	[8–10]	33.0	[26–43]
BPF (n = 3)	212	[207–233]	4.5	[4–6]	8	[8–9]	34.0	[34–35]
P-value	0.473		0.283		0.173		0.802	
Fish products								
BNF (n = 147)	146	[95–181]	6.0	[2–10]	18	[15–20]	1.0	[1.0–2.5]
BPF (n = 6)	181	[180–191]	8.0	[7–9]	12	[10–19]	15.0	[0.5–18]
P-value	0.211		0.617		0.058		0.160	
Seafood, crustacean and shellfish products								
BNF (n = 59)	89	[71–109]	1.5	[1–4]	13	[10–17]	1.0	[1.0–4.0]
BPF (n = 3)	80	[74–118]	1.5	[0.5–4.5]	16	[8–16]	1.0	[0.5–11.0]
P-value	0.961		0.712		0.908		0.659	
Red meat								
BNF (n = 371)	138	[121–188]	6.0	[3.5–11]	20.0	[18.0–21.0]	1	[1–1]
BPF (n = 18)	138	[111–212]	6.0	[2.5–14]	19.5	[18.0–21.0]	1	[1–1]
P-value	0.829		0.868		0.807		0.347	
White meat								
BNF (n = 160)	159	[119–197]	7.0	[2–11]	20	[17–23]	1.0	[1.0–2.0]
BPF (n = 10)	176	[119–203]	8.0	[3–10]	17	[14–20]	6.8	[1.0–13.0]
P-value	0.698		0.931		0.048		0.025	
Processed meat								
BNF (n = 465)	250	[202–351]	20.0	[11–28]	20.0	[16.0–26.0]	1	[1–1]
BPF (n = 28)	253	[166–295]	19.5	[5–24.5]	16.5	[13.0–25.5]	1	[1–1]
P-value	0.417		0.572		0.080		0.381	
Cheese and cheese products								
BNF (n = 283)	365	[308–395]	30.0	[25–32]	25.0	[18–27]	0.5	[0.5–1.0]
BPF (n = 25)	307	[249–355]	25.0	[19–28]	18.0	[10–25]	1.0	[0.5–4.0]
P-value	0.001		0.002		0.016		0.002	
Yogurts								
BNF (n = 114)	107	[101–123]	3.0	[2.9–4.1]	3.5	[3.5–4.0]	15	[14–17]
BPF (n = 7)	89	[54–105]	1.7	[1.4–3.1]	3.5	[3.5–4.5]	15	[7–15]
P-value	0.057		0.070		0.369		0.307	
Biscuits								
BNF (n = 204)	485	[435–519]	23.0	[15.5–29]	7	[6–8]	61	[55–69]
BPF (n = 15)	497	[457–515]	23.0	[18–27]	6	[5–8]	64	[60–67]
P-value	0.589		0.933		0.230		0.308	
Cakes and tarts								
BNF (n = 328)	381	[320–424]	16.0	[10–21]	7.0	[5.0–8.0]	48.0	[41.5–54.0]
BPF (n = 4)	411	[347–431]	16.5	[8–23]	5.0	[4.5–5.0]	59.5	[50.5–63.5]
P-value	0.563		0.988		0.075		0.067	
Creams and puddings								
BNF (n = 83)	157	[123–199]	6.0	[3.5–11.0]	3.5	[3.0–4.5]	20.0	[16.0–23.0]
BPF (n = 4)	113	[96–119]	1.3	[0.9–1.7]	3.3	[3.0–3.5]	21.0	[18.5–22.5]
P-value	0.012		0.001		0.376		0.792	

Table 1 (*continued*)

Food categories	Energy (kcal/100 g or 100 mL)		Fat (g/100 g or 100 mL)		Protein (g/100 g or 100 mL)		Carbohydrates (g/100 g or 100 mL)	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Ice cream								
BNF (n = 158)	126	[106–181]	6.0	[4.0–9.0]	2.5	[2.0–2.5]	17.0	[14.0–22.0]
BPF (n = 4)	87	[72–137]	2.0	[1.3–6.5]	0.8	[0.6–1.7]	14.5	[12.5–19.5]
P-value	0.083		0.183		0.063		0.436	
Salads								
BNF (n = 48)	107	[90–154]	7.0	[4.8–11.0]	3.0	[1.5–6.5]	5.5	[3.8–9.0]
BPF (n = 2)	122	[93–151]	6.8	[4.5–9.0]	2.8	[1.5–4.0]	12.0	[11.0–13.0]
P-value	0.961		0.862		0.747		0.074	
Salty snacks								
BNF (n = 99)	445	[292–485]	18	[12–24]	9	[7–11]	56.0	[27–63]
BPF (n = 11)	477	[294–528]	20	[16–32]	7	[5–9]	53.0	[29–61]
P-value	0.258		0.183		0.224		0.611	
Sandwiches								
BNF (n = 56)	251	[194–274]	11	[7–14]	10.0	[9–11]	23.2	[20–28]
BPF (n = 3)	316	[249–350]	21	[11–23]	12.0	[10–12]	23.0	[21–25]
P-value	0.125		0.063		0.275		0.828	
Soups								
BNF (n = 95)	34	[26–49]	0.6	[0.5–2.5]	1.0	[0.7–1.5]	4.5	[3.0–6.0]
BPF (n = 4)	16	[9–26]	0.5	[0.5–0.5]	0.8	[0.5–1.0]	2.1	[0.6–4.0]
P-value	0.038		0.144		0.224		0.080	
Warm dishes								
BNF (n = 247)	175	[126–242]	6.0	[3.5–8.0]	8.0	[6–11]	20	[13–30]
BPF (n = 15)	200	[136–215]	6.0	[3.0–8.0]	7.0	[6–11]	26	[13–33]
P-value	0.901		0.985		0.607		0.877	
Frozen vegetables								
BNF (n = 68)	34	[24–60]	0.5	[0.5–1.5]	1.5	[1.5–2.0]	4.0	[3.0–5.0]
BPF (n = 4)	41	[33–48]	0.8	[0.5–1.8]	1.5	[1.5–1.8]	4.8	[4.0–5.8]
P-value	0.614		0.664		0.583		0.311	
Fruits and vegetables, tinned								
BNF (n = 131)	59	[31–94]	0.5	[0.5–0.8]	1.5	[0.7–2.0]	7.0	[3.0–15.0]
BPF (n = 14)	45	[29–64]	0.5	[0–0.5]	1.0	[0.5–2.0]	8.5	[3.5–15.0]
P-value	0.185		0.019		0.245		0.944	

BNF, brand name foods; BPF, best price foods; IQR, interquartile range. Values ending with digit 5 were rounded to the upper value (i.e. 1.25 to 1.3). Statistical analysis by Kruskall–Wallis test.

2.2. Food categories and nutrient content

Foods were split in 34 categories according to the classification of the food composition table. In each food category, two different types of products were defined: BPF as the products carrying the store's own brand label such as "*M-Budget*" or "*Prix garantie*" and BNF as all other (more expensive) leading brands. Within each food categories, BPFs were identified and counted. Only food groups that had at least two BPFs were retained for analysis; thus, 26 food categories were used in this study (Supplementary Table 1), corresponding to 4003 food items. Food categories such as porridge, canned fish or cooked vegetables were excluded for lack of BPFs. The energy, macronutrient and micronutrient data were based on the available information of the nutrition label and were expressed per 100 g or 100 mL of product.

2.3. Statistical analysis

Statistical analyses were performed using Stata version 13.1 for windows (Stata Corp, College Station, Texas, USA). Results were computed using the *tabstat* option and expressed as median and interquartile range (IQR). Kruskall–Wallis test corrected for ties was used for comparison between budget and non-budget foods in each category. Due to the non-Gaussian distribution of the data, MANOVA of the macronutrient composition between budget foods and their regular equivalent branded products could not be performed. Due to the number of comparisons performed, statistical significance was assessed for a two-sided $p < 0.01$.

3. Results

3.1. Cost of foods

Data from 4003 food items in 26 food categories were analyzed. The number of available food items varied from 17 to 465 in the BNF group and from 2 to 28 in the BPF group. The costs of the BPF were significantly lower than the cheapest BNF (Fig. 1). Fish products showed the highest difference in mean price between the cheapest BNF compared to BPF equivalent (14.75 CHF) and Fruit and vegetable juices showed the lowest difference (0.31 CHF). Overall, a mean cost saving of 48.9% was found by purchasing BPF equivalents rather than the BNF items in all food categories (Fig. 2). Highest cost saving was found in Soft and energy-reduced drinks (69.4%) followed by Pasta (69.2%). Yogurt and Fruit and vegetable juices categories showed the least cost saving (30.6% and 25.2%, respectively).

3.2. Energy and nutrient composition

The results regarding energy and macronutrients content for BPF and BNF according to different food categories are summarized in Table 1. There were no significant differences between BPF and BNF in almost all food categories. In the Cheese category, BPF had a lower caloric and fat content and a higher carbohydrate content; in the Cream & Puddings category, BPF had a lower fat content compared to BNF ($p < 0.01$).

The results regarding saturated fatty acids, sugar, fiber and sodium contents for BPF and BNF according to food categories are summarized in Table 2. For a sizable number of food items, no information on such

Table 2
Micronutrient composition of BNF and BPF groups from the two main supermarket chains in Switzerland, stratified by 26 different food categories, according to the Swiss food composition database version 5.0 as of April 2015.

Food categories	Saturated fatty acids (g/100 g or 100 mL)		Sugar (g/100 g or 100 mL)		Fiber (g/100 g or 100 mL)		Sodium (mg/100 g or 100 mL)	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Coffee, tea and cocoa drinks								
BNF (n = 36)	1.1	[0–1.5]	9.0	[7.0–11.0]	0.5	[0.5–4.3]	50	[20–75]
BPF (n = 2)	1.3	[1.0–1.5]	41.5	[4.0–79.0]	3.3	[0.5–6.0]	25	[20–30]
P-value	0.667		0.974		0.509		0.357	
Fruit and vegetable juices								
BNF (n = 52)	0.0	[0–0.5]	10	[9–12]	0.5	[0.5–0.5]	10	[0–20]
BPF (n = 3)	0.5	[0–0.5]	9	[6–10]	0.5	[0.5–0.5]	10	[0–20]
P-value	0.401		0.192		1.000		0.938	
Soft drinks, energy reduced								
BNF (n = 17)	0.0	[0–0]	2.0	[0–4.0]	0.0	[0–0.5]	10	[0–10]
BPF (n = 6)	0.0	[0–0]	0.5	[0–1.0]	0.0	[0–0]	10	[0–20]
P-value	0.281		0.311		0.411		0.406	
Soft drinks, sugared								
BNF (n = 98)	0.0	[0–0]	8.0	[6.9–9.9]	0.0	[0–0]	0	[0–10]
BPF (n = 10)	0.0	[0–0]	8.0	[6.0–9.0]	0.0	[0–0]	10	[0–10]
P-value	0.243		0.745		0.661		0.399	
Bread and bread products								
BNF (n = 341)	0.5	[0.5–1.5]	3.0	[2.5–4.0]	3.5	[3.0–4.5]	600	[530–670]
BPF (n = 6)	0.5	[0.5–0.6]	3.0	[3.0–3.0]	3.0	[2.5–4.0]	655	[650–710]
P-value	0.360		0.928		0.240		0.196	
Breakfast cereals								
BNF (n = 39)	1.5	[0.5–4.5]	20	[10–26]	7.0	[5.0–10.0]	230	[70–400]
BPF (n = 4)	3.5	[2.5–4.5]	23	[22–26]	5.3	[4.5–6.0]	310	[220–400]
P-value	0.229		0.161		0.208		0.426	
Cereal bars								
BNF (n = 29)	7.0	[4.0–10.0]	32.0	[30.0–38]	4.5	[4.0–6.0]	150	[120–200]
BPF (n = 2)	5.5	[4.0–7.0]	29.5	[23.0–36.0]	4.3	[4.0–4.5]	150	[100–200]
P-value	0.572		0.629		0.570		0.903	
Pasta (warm dishes)								
BNF (n = 56)	2.0	[1.5–3.5]	2.0	[1.5–3.0]	2.5	[2.0–2.5]	420	[390–500]
BPF (n = 3)	1.0	[0.8–2.0]	1.5	[1.5–1.5]	1.5	[1.5–1.5]	360	[330–360]
P-value	0.139		0.169		0.009		0.062	
Fish products								
BNF (n = 147)	1.0	[1.0–2.5]	1.0	[0.5–1.0]	0.5	[0–0.5]	200	[80–500]
BPF (n = 6)	1.1	[0.6–1.5]	0.6	[0.5–2.5]	0.8	[0–2.5]	300	[60–500]
P-value	0.274		0.992		0.065		0.696	
Seafood, crustacean and shellfish products								
BNF (n = 57)	0.5	[0.5–1]	1.0	[0.5–2.0]	0.5	[0–0.5]	500	[300–640]
BPF (n = 3)	0.5	[0.5–0.5]	0.5	[0.5–3.5]	0.5	[0–0.5]	600	[500–700]
P-value	0.351		0.737		0.878		0.306	
Red meat								
BNF (n = 128)	2.5	[1.5–4.0]	1	[1–1]	0.5	[0.5–0.5]	70	[40–500]
BPF (n = 6)	2.3	[1.5–5.0]	1	[1–1]	0.5	[0–0.5]	40	[40–500]
P-value	0.793		0.980		0.218		0.106	
White meat								
BNF (n = 103)	1.5	[1–3]	1.0	[1.0–1.0]	0.5	[0.5–0.5]	100	[50–570]
BPF (n = 8)	1.3	[1–3]	1.0	[1.0–1.5]	0.6	[0.5–1.0]	550	[80–660]
P-value	0.920		0.041		0.004		0.121	
Processed meat								
BNF (n = 120)	7	[4–11]	1.0	[0.5–1.0]	0.5	[0.5–0.5]	1000	[750–1600]
BPF (n = 9)	6	[2–9]	1.0	[0.8–1.0]	0.5	[0.5–0.5]	825	[745–1550]
P-value	0.263		0.451		0.795		0.567	
Cheese and cheese products								
BNF (n = 228)	18	[15–19]	0.5	[0.1–0.5]	0.0	[0–0]	600	[500–700]
BPF (n = 13)	17	[12–19]	0.5	[0.5–3.5]	0.0	[0–0.5]	600	[380–680]
P-value	0.087		<0.001		0.073		0.322	
Yogurts								
BNF (n = 112)	1.7	[1.6–2.1]	14	[13–15]	0.5	[0.5–0.9]	40	[40–50]
BPF (n = 7)	1.0	[0.8–1.8]	14	[5–15]	0.5	[0–0.5]	40	[30–50]
P-value	0.115		0.432		0.131		0.822	
Biscuits								
BNF (n = 182)	8.0	[4.5–14.0]	35.5	[27.0–42.0]	2.5	[2.0–3.5]	110	[60–200]
BPF (n = 15)	11.0	[5.0–16.0]	32.0	[24.0–36.0]	2.5	[2.0–3.5]	140	[80–260]
P-value	0.342		0.218		0.184		0.172	
Cakes and tarts								
BNF (n = 326)	7.0	[3.5–10]	26.0	[18–32]	2.0	[1.5–2.5]	140	[90–260]
BPF (n = 4)	5.0	[2.8–9.5]	34.5	[33–35]	1.0	[0.9–1.3]	160	[110–250]
P-value	0.652		0.033		0.025		0.770	
Creams and puddings								
BNF (n = 77)	2.9	[2.3–6.0]	16.0	[14.0–18.0]	0.5	[0.5–0.8]	40	[40–50]
BPF (n = 4)	0.6	[0.6–0.8]	16.0	[14.0–18.5]	0.5	[0.5–0.6]	45	[40–50]
P-value	0.002		0.956		0.753		0.840	

Table 2 (*continued*)

Food categories	Saturated fatty acids (g/100 g or 100 mL)		Sugar (g/100 g or 100 mL)		Fiber (g/100 g or 100 mL)		Sodium (mg/100 g or 100 mL)	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Ice cream								
BNF (n = 150)	3.5	[2.5–5.0]	15.0	[13.0–19.0]	0.5	[0.5–1.0]	30	[30–40]
BPF (n = 4)	2.0	[1.3–4.5]	14.0	[11.5–18.0]	0.5	[0.5–0.5]	35	[15–45]
P-value	0.224		0.520		0.072		0.934	
Salads								
BNF (n = 47)	0.8	[0.5–1.5]	2.0	[1.0–3.3]	2.0	[1.0–2.5]	400	[290–445]
BPF (n = 2)	0.7	[0.5–0.8]	0.7	[0.5–0.9]	0.9	[0.8–1.0]	430	[400–460]
P-value	0.398		0.086		0.084		0.440	
Salty snacks								
BNF (n = 94)	3.0	[2.0–7.0]	3.0	[2.0–5.0]	3.0	[1.5–4.0]	700	[480–980]
BPF (n = 11)	3.5	[2.5–7.0]	2.5	[1.5–2.5]	3.0	[2.5–3.5]	500	[360–1000]
P-value	0.941		0.096		0.764		0.243	
Sandwiches								
BNF (n = 56)	2.0	[1.0–3.0]	2.5	[2.0–3.0]	1.6	[1.5–2.5]	550	[455–695]
BPF (n = 3)	3.5	[2.0–7.0]	2.0	[1.0–2.5]	1.5	[0.9–1.5]	640	[590–660]
P-value	0.123		0.271		0.160		0.407	
Soups								
BNF (n = 95)	0.5	[0.5–1.0]	0.9	[0.5–1.5]	0.5	[0.5–0.7]	400	[360–440]
BPF (n = 4)	0.5	[0.3–0.5]	0.5	[0.5–0.5]	0.3	[0–0.5]	420	[400–520]
P-value	0.363		0.035		0.065		0.163	
Warm dishes								
BNF (n = 245)	2.0	[1–3.5]	2.0	[1.5–3.5]	1.5	[1.0–2.0]	450	[400–605]
BPF (n = 15)	1.5	[1–3]	2.5	[1.5–3.5]	1.5	[0.9–1.5]	470	[340–570]
P-value	0.408		0.627		0.265		0.364	
Frozen vegetables								
BNF (n = 49)	0.5	[0–0.7]	3.0	[2.0–3.5]	2.0	[1.5–2.5]	190	[30–340]
BPF (n = 3)	0.5	[0.5–0.9]	3.5	[0.9–3.5]	3.0	[2.0–3.5]	200	[140–400]
P-value	0.423		0.765		0.158		0.365	
Fruits and vegetables, tinned								
BNF (n = 123)	0.5	[0–0.5]	3.5	[0.7–11.0]	2.0	[1.0–3.0]	370	[150–600]
BPF (n = 14)	0.3	[0–0.5]	4.0	[1.0–14.0]	1.5	[1.0–3.0]	175	[0–330]
P-value	0.415		0.809		0.449		0.006	

BNF, brand name foods; BPF, best price foods; IQR, interquartile range. Values ending with digit 5 were rounded to the upper value (i.e. 1.25 to 1.3). Statistical analysis by Kruskall–Wallis test.

nutrients was available, leading to lower sample sizes. Again, there were no significant differences between BPF and BNF in almost all food categories. In the Pasta and White meat category BPF had lower fiber content; in the Cheese category BPF had higher sugar content; in the Creams and puddings category BPF products had lower saturated fatty acid content and in the Tinned fruits and vegetables category BPF products had lower sodium content than BNF ($p < 0.01$) (Table 2).

4. Discussion

Our results show that the energy and macronutrient composition of BPF in Switzerland does not differ significantly from their regular equivalent BNF. Contrary to the USA, where healthy food choice is reduced and more expensive in low-income neighborhoods (Jetter and Cassady, 2006; Krukowski et al., 2010; Liese et al., 2007), in Switzerland prices are relatively constant irrespective of supermarket location. Also, quality of products is relatively constant, contrary to other countries where stores in more affluent areas tend to have the highest-quality products (Cummins et al., 2009). Further, supermarkets in Switzerland offer time-limited price rebates as high as 50% on most types of foods (including fruits and vegetables), making healthy eating more affordable. Overall, our results contradict the common beliefs that BPF are less healthy than their BNF equivalents and that a healthy diet is forcibly expensive. Still, compared to BNF, the number of BPF was rather low, indicating that although BPF are nutritionally comparable to BNF, the choice of BPF is very limited.

4.1. Cost of foods

The results of the present study also highlight that the price of BPF are almost two times less than the equivalent BNF (48.9%), a finding in agreement with the literature. Indeed, two studies in France and United Kingdom reported that branded products cost 2.5 times higher than low-cost products (Cooper and Nelson, 2003; Darmon et al., 2009) and a study conducted in Australia showed a 13% cost reduction by substitution of low-cost for branded products (Kettings et al., 2009). Importantly, our results suggest that buying BPF, and particularly core foods like bread, red meat, white meat and fish products, can lead to cost savings as high as 42%, 38.8%, 41.9% and 45.6%, respectively.

4.2. Energy and nutrient composition

No major difference regarding energy and macronutrient content were found between BPF and BNF, a finding in agreement with the literature (Carlson and Frazao, 2014; Darmon et al., 2009). Interestingly, but for specific food categories only, BPF had a lower saturated fat (Creams and puddings) and sodium content (Tinned fruits and vegetables) than BNF, suggesting that in some cases BPF might actually be healthier alternatives than BNF ones, although the choices are very limited in some categories. These findings are in agreement with one study conducted in the UK, which reported that low-cost foods of four major English supermarkets had a similar and often better nutrient composition than branded foods (Cooper and Nelson, 2003).

4.3. Importance for public health

In Switzerland, less than 20% of the total household budget is dedicated to food expenditures (Federal Office of Statistics, 2015). Still, data from the Swiss national health surveys consistently report that over half of people consider a healthy diet as expensive (Lieberherr et al., 2010), a finding also reported in other countries (Darmon et al., 2009). This widely reported opinion that healthier eating is expensive

should be balanced; indeed, it has been shown that a healthy diet can be achieved without increasing food expenditures (Conforti and D'Amicis, 2000). Our results thus indicate that BPF could replace BNF without significant changes in major nutrients and with a sizable decrease in food expenditures. Thus, implementation of cheap, nutritionally-rich foods could be an effective way of promoting healthy eating, namely by expanding the choice of BPF within each food category.

4.4. Study limitations

This study has several limitations worth acknowledging. Firstly, it was based on available data from the Swiss Food Composition database, and some brands were underrepresented. As only food groups with at least two BPF were retained, several categories were eliminated, corresponding to 315 food items. These findings indicate that the availability of BPF is very low in some of the food categories. Secondly, only data for the main nutrients were available, precluding any systematic analysis of the mineral and vitamin content of the foods. Further, no data on most vitamins, micronutrients such as iodine and potential harmful substances such as flavorizing agents or food additives were available in the database. Implementing the food composition database with such information could be a good focus for future research. Still, analysis of the available micronutrient content between BPF and their regular equivalent BNF showed no particular differences and in some cases even favored BPF. Thirdly, only products from the two main food retailers in Switzerland were assessed. Still, as both retailers represent 70% of all foods and drinks purchased in Switzerland (Stephens, 2010), we believe that our findings might be of interest to a majority of the Swiss population. Fourthly, some food groups had very few BPF items, leading to a reduced statistical power. As only nonparametric tests were used, power calculations cannot be conducted. Fifthly, the $p < 0.01$ threshold was chosen arbitrarily and did not take into account the multiple comparisons performed; based on 200 tests, a more conservative threshold would have been $0.05/200 = 2.5 \times 10^{-4}$. This threshold would have made all comparisons between BPF and BNF non-significant, and would not change the conclusion that BPF are nutritionally comparable to BNF. Finally, only processed foods were assessed, and these foods might not replace other foods such as fruits and vegetables; still, in Switzerland, 20 to 50% discounts on fruits and vegetables are relatively common in these two supermarket chains.

5. Conclusion

In Switzerland, BPF do not differ significantly from their BNF equivalents regarding energy and macronutrient composition and could thus be an interesting alternative for economically deprived people. Still, the choice of BPF is limited and the nutritional information available is scarce.

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Conflict of interest

All authors indicate no conflict of interest.

Authorship

SK-S analyzed data and wrote the paper; PM-V designed research and collected data. PM-V has primary responsibility for the final content. All authors have read and approved the final manuscript.

Transparency document

The Transparency document associated with this article can be found, in the online version.

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