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***Energy Profiles and Nutrition Information in Food Product Categories Selected in Finnish Grocery Stores, Considered from a Weight Management Perspective***

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**ABSTRACT:**

It is important to show in practice how challenging an environment a grocery store is to consumers from a weight management perspective. This paper reveals the variation in energy content of products within a product category, in relation to selections made by those consumers actively engaged in weight management. It also shows several non-standardized ways of displaying products' nutritional information, as well as the study subjects' opinions about package labeling. For a consumer, it is important to be able to easily find, identify and compare suitable products from a weight management point of view. Successful consumer marketing will achieve desirable results for manufacturers, retailers and consumers, as well as being of benefit to society's welfare in the long run.

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**Introduction**

Globally, there are about 1.5 billion people who are overweight and more than 500 million people who are significantly obese. Obesity rates in the United States are the highest in the world (WHO 2008). Obesity is debilitating, reducing the quality of life and the ability to work as it increases the risk of contracting another disease.

The food industry produces a bewildering array of products for the consumer to buy all over the world. Grocery stores everywhere present a challenging environment in which to find suitable products, because of the enormous variety of goods and the variation in packaging and labeling. A particular problem is the variation of energy contents found between items within certain product categories. (Drichoutis, Lazaridis and Nayga 2006; Oppewal and Koelemeijer 2005; Mantrala, Levy, Kahn, Fox, Gaidarey, Dankworth and Shah 2009; Colby, Johnson, Scheett and Hoverson 2010; Lempert 2002)

The number of food products available from grocery stores varies from shop to shop (Mantrala et al. 2009). The number of items in a product category plays an important role in how consumers think about complex shopping decisions (Lempert 2002; Dellaert, Arentze and Timmermans 2008; Boyed and Bahn 2009). The relationship between the choice of food by consumers and their lifestyles, is a complicated phenomenon, affected by several factors including their personal needs (Shepherd and Raats 2006; Perez-Cueto, Verbeke, de Barcellos, Kehagia, Chryssochoidis, Scholderer and Grunert 2010). The individual nature of this food selection process (Shepherd and Raats 2006; Levy and Weitz 2011) is a real challenge to quantify, and a driving force for product developers within the food industry and

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for retailers within the food product and services development industry (Mantrala et al. 2009; Boyd and Bahn 2009).

Manufacturers produce a wide selection of products to fulfill the conscious and subconscious needs of consumers. For example, nowadays, there is an enormous variety of types of milks (Fineli 2011). These variations in milk are due to differing concentrations in several nutrients—such as: fat, proteins, lactose, vitamins, etc. These kinds of variations can be seen in other product categories too. Therefore, it is not a simple task for a consumer to know both what choice to make from all the alternatives when they have limited time (van Herpen and van Trijp 2011), and also how much energy products may contain (Grunert, Willis and Fernández-Celemín 2010). Consumers often choose products routinely (Ekström 2010) as this is the quickest way. Therefore, the time spent reading the labels on food packaging is almost nil (Grunert and Willis 2007; Grunert et al. 2010; Storcksdieck genannt Bonsmann, Celemin, Larranaga, Egger, Willis, Hodgkins and Raats 2010).

According to Paradis and Cabanac (2008), people actively dieting and trying to maintain their normal body weight choose high-calorie products more easily and subconsciously than those consumers passively managing their weight. A study by Raynor, Van Walleghe, Bachman, Looney, Phelan and Wing (2011) showed a positive relationship between dietary energy density and body mass index and suggested that consuming a diet with lower energy density may aid with the maintenance of weight loss. If products have no special labeling or have a number of complex methods of indicating the energy contents of that product, the actual energy contents can vary dramatically across a range of similar products (Fineli 2011). Understanding what the energy contents of a product might be is then dependent on a consumer's skill and knowledge in interpreting this information (Drichoutis et al. 2006).

In order to select low-energy foods, consumers have to be able to identify and separate the low-energy products from the ones with a higher energy content. There are several possible ways to indicate the energy content of a product to consumers (Colby et al. 2010; van Herpen and van Trijp 2011). Indicators of energy content based on traffic lights (Food Standards Agency 2007; Sacks, Rauner and Swinburn 2009; Balcombe, Fraser and Di Falco 2010), a system not used in Finland, or other similar country-specific symbols, such as the Finnish Heart Symbol (Kinnunen 2000), are rarely exploited when reporting nutritional characteristics either on the packaging of wrapped food, on the shelves in grocery stores or in other places where this information needs to be communicated. The Guideline Daily Amount (GDA) -labeling system has been used as an attempt to standardize the information given to consumers using portion sizes and comparing those portions to total daily energy amount requirement, which is set to 2000 kcal/day (GDA's Website 2011). Energy displayed in kcal/100g and other nutritional values are often (EU Website 2011), but not always, shown on the sides of the package, but not on the front. The EU has now enacted a regulation that every package should be marked with nutritional values by the manufacturer (EU's Food Safety Committee 2011). There are several other symbols that can be displayed on packaging. These include those concerning origin and whether the food is organic or not, along with strictly regulated health claims (EU Website 2011; Colby et al. 2010) such as "decreases your bloods' cholesterol level". Other information displayed can include

nutritional statements such as “rich in fiber” or other information relating to ingredients such as “no additives” (Colby et al. 2010).

Even if manufacturers try to help consumers in their choice of low-energy-content food by designing ways of showing nutritional information on food packaging, several studies have found that many consumers think that nutritional labels, especially in relation to the numerical information and the terminology used, are complex (Byrd-Bredbenner, Wong, and Cotte 2000; Cowburn and Stockley 2005). In addition, the review by Cowburn and Stockley (2005) reported that consumers have difficulties converting information from “g/100g” to “g/portion”. Especially, in a grocery store environment in particular, consumers are constrained as to how much of this information they are presented with (Feunekes, Gortemaker, Willems, Lion and van den Kommer 2008).

Recently, retailers and manufacturers have increased their goals and resources in the area of the shopper marketing (Neff 2009). Deloitte Research (2007) defined shopper marketing as: “The employment of any marketing stimuli, developed based on a deep understanding of shopper behavior, designed to build brand equity, engage an individual in “shopping mode” and lead him/her to make a purchase.” In the area of nutrition communication, marketing psychology is too often a monolog by many manufacturers and stores. The products try to capture consumers’ attention and try to say: “notice me, buy me”. Shankar et al. (2011) described several innovative possibilities to create more dialog between consumers and the products available, such as using digital technology.

In order to tailor clear marketing messages or services aimed at the market for weight management products, food manufacturers and retailers need practical information on what the nutritional challenges of selected products are from a consumer perspective. The main aim of this paper is to report on the complexities of understanding both energy content and nutritional statements displayed on a variety of food products across a range of categories, from the point of view of weight management. Another aim is to describe how consumers select products from the perspective of energy content within an authentic grocery store environment. In this paper, we rouse food manufacturers, marketers, retailers and authorities to consider consumers’ challenges in a weight management market.

## Material and methods

### *Observational study using eleven product categories selected in grocery stores*

In this first part of the study, we collected data which revealed the variation in energy content of products within a product category selected. The data for energy profiles and package labels of the 11 food product categories selected were collected from food packages (n=2484). The data for the 11 were collected by using a standardized recoding form from December 2009 to January 2010 at 17 different sized grocery shops all around Finland in the cities of Kuopio, Tampere, Joensuu and Oulu (six hypermarkets, six supermarkets and five self-service shops). The 11 selected food categories were chosen using criteria based on Finnish eating habits and the key sources of energy and fat. By using these criteria, it

was hoped to obtain a variety of data about all products that were available at the time in Finnish grocery stores. Permission from the retailers of every grocery store involved in this study was obtained prior to data collection.

*Consumer study of product selection in a single grocery store*

The purpose of the second part of the study was to examine how consumers who were actively managing their weight choose products at a certain grocery store (Citymarket Kolmisoppi, Kuopio, Finland), which was one of the 17 grocery shops involved in the study. In addition, the energy contents of the products selected (n=792) by the subjects were compared to the whole range of energy contents in the product category, as measured in the first part of the study. The 36 selected weight management subjects were recruited from a population of 367 supermarket shoppers in Finland, Kuopio (Table 1).

TABLE 1: Demographic data for consumers enrolled in the study at a supermarket (n=36)

Demographic	Variation	Percentage	n
Gender	Male	39	14
	Female	61	22
Age	<30	11	4
	30-60	75	27
	>60	14	5
Marital Status	Families with children	50	18
	Single	11	4
	Married, cohabitation	31	11
	Several adults cohabitation	8	3
Highest Education	Primary School	3	1
	Vocational, College	47	17
	University Degree	50	18
Employment Status	Employed, high status	11	4
	Employee, entrepreneur, student	69	25
	Retired, unemployed , at home	20	7
BMI, kg/m <sup>2</sup>	<25	31	11
	25-30	58	21
	31-40	11	4

In addition, one in two had attempted to lose weight at least once or twice during their lifetime. Most of the subjects (67%) indicated that they usually shopped for groceries at the supermarket being studied.

The subjects were given general background information about the nature of the experiment by telephone. The researcher's assistant arranged a meeting with every subject at the same supermarket at a date and time of their choice. The data was collected using a verbal analysis protocol combined with wireless and manual audio-visual observation which will be

reported in more detail elsewhere. Approval from the Research Ethics Committee of the University Hospital of Kuopio was obtained prior to data collection.

The subjects' shopping experiment included two shopping assignments (a normal one, and a weight management one) and was carried out in April and May 2010. Based on typical Finnish sources of energy and fat, a shopping list of 11-items was given to subjects twice. The selected items are mentioned in tables 2-3. The first time, the subjects were asked to select the products as follows: "Pick up the product, which you typically buy and use"; this was the normal assignment. The second time, the subjects were instructed to "Pick up the product, which you typically use, or a product which you are able to consume when managing your weight"; this was the weight management assignment. Subjects were asked how often they used product from each category just after they have selected it. No instructions were given, -even if a subject asked for help whilst selecting products. Before the second assignment the subjects were unaware of it. At the end of the experiment, the subjects participated in a short interview about the products selected, discussing issues such as ease of product selection, and their opinions and habits relating to their reading of package labels. They received the selected products in thanks for their participation in the study. This came as a surprise because otherwise it could have affected their food selection. After the whole experiment, many subjects stayed in the supermarket to do their weekly groceries.

Both of the observational studies concerning the eleven product categories selected in grocery stores and the consumer study of product selection (2 selections×11 products×36 consumers=792 product selections) in a single grocery store produced quantitative and qualitative data. Several variables related to the food products were collected, such as product name, manufacturer, energy content; the number of kcal/100g as well as kcal/portion and the recommended energy amount % (GDA), if marked. If the GDA was not found, the nutritional values were obtained from the manufacturers' internet pages or from their customer help department. Any nutritional statements relevant to weight management were also recorded, relating to areas such as fat, fiber, sugar and other issues.

To measure the subjects' reactions towards the use of labels on the packaging and the grocery store's environment, statements were used alongside the interviews. The statements were taken from several other studies and designed to measure the respondents' satisfaction with the products' nutritional labeling and promotion. The statements were rated on a 4-point Likert-type scale where 1 was "strongly agree" and 4 was "strongly disagree", with 5 being "do not know".

For qualitative data collected from interviews, content analysis procedures were undertaken using software to perform data categorization, such as the ease of product selection as well as the readability and ease of use of the package labeling and possible developments. The coding categories were created whilst piloting the procedure and refined during the study. The quantitative data was processed using SPSS version 17.0 (Statistical Package for the Social Sciences); in addition, summary statistics, such as frequencies, means and their comparisons and correlations were calculated, depending on the scale and function of the variables in the study.



## Results

### *Variation of products and their energy contents*

In the present study, we collected data which revealed the variation in assortments of products and energy content of products within a product category selected from weight management perspective. In Table 2, the number shown after the product indicates the highest number of different products within that category at a single store, which was usually found in bigger grocery stores across Finland. In addition, the number of products within categories was lower in small shops than in supermarkets. This was reflected in the fact that because the range of energy profiles within a product category was limited in small shops, there was less opportunity to select low-calorie products. Also, it was found that the placement of products in grocery stores varied day to day and between shops belonging to the same grocery chain. In general, there were plenty of options to choose from especially ready meals, cookies and yoghurts. The range of prepared salads was the smallest compared to the other product categories.

Without exception, the range of energy content variation was large between products within the same product category. The biggest range of energy contents in any food product category was found in salad dressings, fat spreads, and cold cuts because of the high fat content of these items (Table 2). When interpreting the energy range across different quartiles, the differences between the products was noticeable. For example, one in four soft drinks had less than 2 kcal/100g, so there were plenty of low-calorie products available in this product category. Also, when considering cold cuts, the energy range was quite narrow in the first quartile, so there was a good selection of low-calorie products. Low-calorie products were not so readily available for juices, salad dressings, cookies and prepared salads when comparing the first quartile's energy range to the maximum energy content of different product categories. High-calorie products were well represented in fat spreads because one in four of those products were located in the fourth quartile of energy content variation. There were a lot of high-calorie products in the cold cuts and cheese categories.

It was also possible to analyze the qualitative aspect of every product category, such as ingredients, processing methods used etc. based on the data collected. For example, the first quartile of ready meal products contained more soups (meat, fish, or vegetable soup), vegetarian pasta dishes, casseroles, porridges and dishes mostly rich in vegetables than the other quartiles. The second and third quartiles included more dishes containing added mashed potatoes, woks-, noodle dishes and some dishes baked in the oven, but also some soups. The fourth quartile contained steaks, meat and potato dishes, pizzas, meat pastries, hamburgers and hot dogs. An interesting feature was that in the case of cookies there were salted crackers like Tuc<sup>®</sup> that could be found in every quartile because of the range of different ingredients used in the products.

TABLE 2: Energy profiles of eleven food product categories divided by quartiles with the difference between maximum and minimum energy content for the same product categories and the prevalence of the use of the guided daily amount

Product	First quartile kcal/100g	Second to third quartiles kcal/100g	Fourth quartile kcal/100g	Difference of max. and min. energy values kcal/100g	Fineli's <sup>□</sup> min. and max. values	Prevalence of GDA labels on selected products categories %
Fat spread, n=94	* <b>220</b> – 350.9	351 – 717.9	718 – <b>720</b> **	500	? – 725 <sup>□</sup>	18
Yoghurt, n=363	* <b>26</b> – 65.9	66 – 99.9	100 – <b>160</b> **	134	24 – 134 <sup>□</sup>	25
Cold cuts, n=263	* <b>83</b> – 100.9	101 – 239.9	240 – <b>450</b> **	367	90 – 423 <sup>□</sup>	15
Ready meal, n=459	* <b>30</b> – 100.9	101 – 149.9	150 – <b>330</b> **	300	18 – 348 <sup>□</sup>	39
Prepared salad, n=74	* <b>23</b> – 120.9	121 – 249.9	250 – <b>320</b> **	297	23 – 205 <sup>□</sup>	21
Cheese, n=136	* <b>180</b> – 272.9	273 – 379.9	380 – <b>496</b> **	316	168 – 465 <sup>□</sup>	0
Bread, n=275	* <b>140</b> – 230.9	231 – 262.9	263 – <b>339</b> **	199	158 – 339 <sup>□</sup>	39
Cookies, n=397	* <b>262</b> – 439.9	440 – 494.9	495 – <b>570</b> **	308	334 – 595 <sup>□</sup>	23
Salad dressing, n=76	* <b>35</b> – 240.9	241 – 369.9	370 – <b>594</b> **	559	55 – 668 <sup>□</sup>	4
Soft drink, n=109	* <b>0</b> – 1.9	2 – 39.9	40 – <b>48</b> **	48	0 – 49 <sup>□</sup>	6
Juice, n=238	* <b>1.5</b> – 40.9	41 – 44.9	45 – <b>59</b> **	57.5	6 – 53 <sup>□</sup>	65

Total, n=2484

\*=observed minimum energy content of food product category

\*\*=observed maximum energy content of food product category

?=light products/min. value not found in Fineli's food composition database

□ =energy values based on Finnish food composition database

### *Variation in energy content of the products selected*

The purpose of the second part of the study was to examine how consumers, who were actively managing their weight, choose products at a certain grocery store. Neither the subject's socio-economic status nor their weight management status affected the following results. The reduction in energy content in products selected when subjects were undertaking the weight management assignment differed between product categories. Table 3 shows that the majority of subjects chose low energy products when selecting cold cuts (67% of products selected) and cheeses (42%), and high energy products when selecting juices (50%) in the normal assignment. Bread was the most stable product with the respect to energy distribution selected by the subjects, because the majority of them (83%) chose bread from the middle energy quartile in both assignments.

In the weight management assignment, the majority of subjects chose low energy products in many product categories, such as cheeses (89% of products selected), prepared salads (86%), yoghurts (83%) and ready meals (81%), as well as in cold cuts (75%). High energy products were selected from the juices (47%). The most stable products in terms of energy distribution selected by the subjects were bread (72%) and salad dressing (75%), located in the middle quartile.

### *Identifying suitable products*

Based on the data collected in 17 groceries, the GDA label scored best for soft drinks, but worst for cheeses amongst all the products (Table 2). Based on the subjects' product selection, again, the GDA label scored best for soft drinks, but worst for cheeses. Statements, about energy content, such as "low in calories", "contains X calories" and "light" were found most on cold cuts (33% of products selected), but none on the packaging of bread or cookies that were selected.

Based on the observations made of products (n=2484), there were many non-standard ways of labeling food products. For example, there were 18 different ways of declaring the energy content among a single product category, such as "X kcal/100g", "X kcal/portion", "energy X kcal", "low in calories", "light X%", "lighter", "less than X calories/product", "new lighter choice", "no calories". Sugar content was displayed in 16 ways, fat content in 15 ways, fiber content in 11 ways etc. GDA principles were used on many packages, but there was also variation amongst the models and the portion sizes of the same product category. Apart from the GDA label, there was only one other standardized symbol found on food packages, the Finnish Heart Symbol, which summarized many variables such as energy, fat, sugar, fiber and salt content. At most, there were eight different nutritional statements on the front of one package displaying GDA, "light", "only X kcal", "low fat", "good protein source", "less salt", "lactose-free" and "gluten-free". An example of a product with eight-such statements was found among the cold cuts.

To measure the subjects' reactions towards the use of labels on the packaging and the grocery store's environment, statements were used alongside the interviews. The subjects' opinions about the use of the GDA varied the most and, in fact, one in three subjects had not noticed or used the GDA label at all. All the subjects agreed with the statement: "Labeling will help me to find suitable products". However, every other subject would have had more information on the food labeling on products and one in four subjects would have liked to have had personal guidance when selecting food in grocery stores. Opinion about the need for a unique symbol to indicate weight management



products divided the subjects almost fifty-fifty. To the question: "How actively do you use nutrition related symbols, labels or claims in food selection?", every other subject answered that they had never used the GDA label, whereas one in three subjects had used the Finnish Heart Symbol when selection products. Subjects said that nutritional or health statements relating to fat/sugar were read randomly on food packages.

TABLE 3. Distribution of energy quartiles relating to the products selected by thirty-six subjects' in two shopping assignment

Product	First quartile kcal/100g				Second to third quartiles kcal/100g				Fourth quartile kcal/100g			
	Assignment		Assignment		Assignment		Assignment		Assignment		Assignment	
	Normal n	Weight management %	Normal n	Weight management %	Normal n	Weight management %	Normal n	Weight management %	Normal n	Weight management %	Normal n	Weight management %
Fat Spread	12	33%	22	61%	22	61%	13	36%	2	6%	1	3%
Yoghurt	12	33%	30	<b>83%</b>	23	64%	5	14%	1	3%	1	3%
Cold cuts	24	<b>67%</b>	27	<b>75%</b>	11	31%	9	25%	1	3%	0	0
Ready meal	13	36%	29	<b>81%</b>	14	39%	4	11%	9	25%	3	8%
Prepared salad	11	31%	31	<b>86%</b>	17	47%	4	11%	8	22%	1	3%
Cheese	15	<b>42%</b>	32	<b>89%</b>	18	50%	4	11%	3	8%	0	0
Bread	4	11%	10	28%	30	<b>83%</b>	26	<b>72%</b>	2	6%	0	0
Cookies	5	14%	20	56%	22	61%	16	44%	9	25%	0	0
Salad dressing	5	14%	1	3%	20	56%	27	<b>75%</b>	11	31%	8	8%
Soft drink	9	25%	16	44%	19	53%	18	50%	8	22%	2	6%
Juice	13	36%	18	50%	5	14%	1	3%	18	<b>50%</b>	17	<b>47%</b>
Total, n=396	123	31%	236	60%	201	51%	127	32%	72	18%	33	8%

The final interview showed that almost every subject had some ideas on how to improve food package labeling. The majority of the subjects wanted a product's nutritional information to have been written larger or in a clearer way, using a simpler, uniform method. One in three subjects was confused by food packages that had both the GDA labels and nutritional values kcal/100g marked alongside each other. Some subjects also pointed out that several nutritional statements could have been amalgamated from a weight management perspective and marked with a unique symbol

designed to look like a “slimy, silhouette or figure”. The traffic light system was not mentioned, but there were a couple of suggestions about organizing the products in a way that low-calorie products and high-calorie products were separated into their own sections on shelves. Also, uniform color or numbering codes for foods according to the nutritional levels of the product were suggested by a few of the subjects.

Based on the observational study conducted in the 17 grocery stores, there were no shelf markings or other ways in which consumers could more easily find the desired weight management products in shops, besides the information on the products’ package. The opinion of the majority of subjects was that the food package information was generally good, but a consumer would need enough time to examine the whole product category if they wanted to change their familiar product for another because of weight management considerations or other reasons.

According to the interviews, fat spread (92% of products selected) was the easiest to select, then cheese (83%) and yoghurt (81%); the most difficult choice to make was that of ready meals (67%) and prepared salads (56%) for the normal assignment. For the weight management assignment, the easiest selection to make was cheese (69%), the cold cuts (67%) and soft drinks (61%), followed by bread (55%), yoghurt (55%) and fat spread (52%). From the weight management point of view, the most difficult choice was that of ready meals (92%), then cookies (78%), salad dressing (78%), juice (75%) and prepared salad (73%). Subjects found only the fat spread easy to choose for both assignments ( $r=0.447$ ,  $p=0.001$ ); selecting cheese was also found to be easy ( $r=0.355$ ,  $p=0.05$ ). No similar correlations with other products were found.

In the final interviews, many subjects pointed out that it was easy to choose a product if the fat content was clearly marked on the front of the packaging, as it was for most examples of fat spreads, cheeses and yoghurts selected: “In the case of finding this cheese, this 5% marking helped me a lot to find a suitable product among all these alternatives. Without these clear markings I would give up on reading these things” (a man, 52 years). General comments on the difficulties in selecting products included: “It would have taken me too long if I had started reading all these things and furthermore, I did not find all the nutritional values on packages. Some manufacturers have marked the values well, but on some packages they are missing” (a woman, 54 years).

When asking the subjects (1=enough, 2=OK and 3=not enough) if there was enough variety of products that were suitable for the weight management assignment, the ranges of cheeses ( $1.1\pm 0.3$ ) and yoghurts ( $1.1\pm 0.4$ ) were considered the best and the ranges of ready meals ( $2.5\pm 0.6$ ), prepared salads ( $2.5\pm 0.6$ ) and cookies ( $2.5\pm 0.6$ ) were considered the worst.

## Discussion

### *Variation of products and their energy content*

This study has shown what a challenging task it is for a consumer actively managing their weight to observe and assess the differences in energy content within the same product category; this was also found in a study by Grunert et al. (2010). Table 2 shows that there are large differences between the distribution of energy contents across quartiles such as for soft drinks and juices. In case of juices, there were so few low-energy options to choose from in comparison to soft drinks. It is important for a consumer managing their weight to be aware of the difference in energy contents within the same product category (van Herpen and van Trijp 2011). If there are only a few low energy products available within a particular product category, it is more difficult to find them among all the other products. Also, one interesting finding was maximum energy content observed in prepared salads

being 320 kcal/100g. It was close to the maximum energy contents of ready meals (330 kcal/100g). Salads are not necessarily a better option when related to weight management.

It can be seen that the energy profile data of products collected over two months in 17 groceries gives an overall idea about the challenges to consumers who are actively managing their weight. The size of a product category's range may fluctuate because of new products being introduced, old products being phased out and seasonal or imported products being available in a shop. However, the family of products in a category created by retailers will not change radically (Levy and Weitz, 2011). So, the effect of changes among single products in a particular category is diluted over time because of product replacement (Koistinen, Lammi and Rajas 2009).

We also noticed that the variation between the energy contents collected from the labels of products was mostly larger than between the most commonly used databases such as Fineli. It implies that databases are not able to be so up-to-date because of continuous product development by manufacturers. Before their information is transferred to these databases, new products have already been launched into the markets (Champagne 2009; Castanheira, Roe, Westenbrink, Ireland, Møller, Salvini, Beemaert, Oseredzuk and Calhau 2009). For example, the maximum energy content in kcal/100g was greater for ready meals, salad dressings and cookies in the Fineli database than was observed in the 17 grocery stores. One reason for this might be the fact that the Fineli –database also includes the energy contents of home-made dishes (Table 2)

It is known that the food industry and retailers have their own systems for organizing ranges of products (Levy and Weitz 2011). By rearranging and designing the layout of these ranges from a nutritional perspective, there could be a significant impact on public health. In addition, it is essential for retailers, especially in small shops, to manage product categories carefully (Levy and Weitz 2011) so that they can quickly identify a possible lack of suitable weight management products. We also noticed that the placement of products in grocery stores varied from day to day and between shops belonging to the same grocery chain. From the perspective of a consumer, the placement of products in the same location on the shelves may help in finding that product, particularly if products are also arranged in a logical way regarding their nutritional content (Berning, Chouinard, Manning, Cluskey and Sprott 2010). It is known that in some grocery chains retailers are able to decide what kind of products they sell (Koistinen et al. 2009). So, if retailers favor more healthy products, this will impact on public health in the long run. In addition, there are innovations that will help consumers managing their weight to select appropriate food products; some of these ideas are described in more detail by Shankar, Inman, Mantraka, Kelley and Rizley (2011). One example is the standardization of product codes, which would make it easier to display a range of parameters such as nutritional information. Consumers would be able to check the suitability of a product to their diet without having to read a number of different statements on the label.

#### *Variation between individuals*

The results outlined in this paper the 396 product selections made by 36 subjects, are surely transferrable to other scenarios when considering how consumers actively engaged in weight management behave in grocery stores in different countries.

Mostly, the consumers were able to reduce the energy content of their selected products for the weight management assignment. (Table 3) For example in this study, some subjects saw a cheese containing a 5% fat, but still chose a cheese containing 10% fat because of the more acceptable taste and texture of the cheese. From the studies undertaken by Rawson, Janes and Jordan (2008) and van Herpen and van Trijp (2011), it seems that consumers pay attention to labels when there are some motivating factors behind their food choice, such as dietary needs. In addition, Paradis and

Cabanac (2008) found that people who are losing weight choose high-calorie products more readily and subconsciously than those who are passively managing their weight; this is because the natural inclination of the former group is to return to their normal body weight.

In this study, the significant reduction in energy content of the products selected between the normal and weight management assignments was largely due to the clear labeling of fat content on the front of the packaging of cheeses and yoghurts (Table 3) and the wide variety of products available within those categories (Table 2). The reason for a similar reduction of energy content in soft drinks was due to the clear labeling with respect to sugar content, where terms such as “light” or “zero” were displayed, along with the use of the GDA label (Table 2). The prepared salads product category contained only a small percentage of the total number of products available (Table 2), and there were few low-calorie products that could be purchased. For the subjects of the study, it was also hard to reduce the energy content of cold cuts in the second assignment, because the majority of subjects had already chosen mostly low fat products in the first assignment (Table 3). Another challenging product category was juice because of its wide range of items and the distribution of energy content in the first quartile (Table 2). The result shows that the range of low energy juices is small, and most of them have their energy content recorded in the fourth quartile (Table 3). Subjects were aware of the high calorie products such as cheeses and cold cuts because the subjects chose mostly low fat ones already during their typical shopping route (Table 3). Because of more precise reading of package labels in the second assignment, the subjects succeed to choose better low energy products (Table 3).

#### *Identifying suitable products*

Across the EU, it is not obligatory to use the GDA label on food packages (Food from Finland, 2011). For this reason, it was understandable that the use of the GDA label varied. (Table 2): it was up to manufacturers to decide whether to use the GDA (Food from Finland 2011). Of course, in the case of cheese, the GDA label is not desirable because of the high energy content of cheese. If the GDA label had been used on the packaging of cheeses, it might have put across a negative message to the consumer. However, even though soft drinks contain a lot of sugar and therefore energy, it was noticeable that the GDA label was often used on those products (Table 2).

In this study, we found that the subjects were not accustomed to the GDA label, with many of them either unaware of the label and finding the GDA label confusing and complex, as Cowburn and Stockley (2005) reported. In a study by Feunekes et al. (2008), it was found that if the GDA label was used on packages, consumers took longer to make their selections compared to other simple labeling formats developed especially for the study. In a study by Grunert et al. (2007), many consumers also preferred a simplified front-of-pack nutrition label.

It is too complicated a task for the consumer to read, for example, eighteen different types of statement about energy content. This information overload is a burden for a consumer (Golan, Kucler, Mitchell, Greene and Jessup 2000). According to consumers' opinions, generally labels are helpful but energy content statements are written too small to be noticeable. The labeling of food packaging requires simplifying because there are too many labels on one package and the same nutritional message is displayed in too many different ways from one product to another; this has also been reported in van Herpen and van Trijp (2011).

In the normal assignment, products were generally easier to choose because the subjects were able to select products they were most familiar with. In the weight management assignment, the products chosen were not so familiar making them harder to select. In this study, fat spread, cheeses and yoghurts were the easiest choices to make by the subjects because of the good, clear signs

concerning fat percentage marked on the front of the packaging (based on conversations with the subjects and observations made about the packaging), as well as because these ranges of products included many items suitable for help with weight management. In many packages, such as those for ready meals or prepared salads, nutritional information was lacking or it was marked unclearly and often only on the reverse side of a package.

An interesting finding was that the subjects felt that the range of ready meals and cookies was insufficient even if, according to the product category analysis undertaken in the first part of this study (Table 2), there was a large range of ready meals and cookies. One reason could have been that nutritional composition of the products or their nutritional information concerning the suitability of products for the weight management assignment was not easily found on food packages. New regulations introduced to the EU help consumers to find nutritional facts on packaging more easily than before (EU Website 2011). That many consumers had ideas for the improvement of labeling, showed the need for simplifying or clarifying both the information content and the appearance of labels on the packaging: this was also found in a study by Grunert et al. (2007).

According to the final interviews, the majority of the subjects realized that: "Grocery shops do not develop and utilize consumer services". At grocery stores, there is still room for innovative consumer services. The subjects also pointed out that: "I would like to use more services related to nutrition". Shankar et al. (2011) stated that "The goal of shopper marketing is to enable a win-win-win solution for the shopper-retailer-manufacturer". So why not seek a solution where everyone is a winner? In this situation, the fourth actor is undoubtedly society, when the other actors take social responsibility for consumers' welfare. Colby et al. (2010) pointed out that dieticians are able to increase consumers' awareness of package labeling. In addition, dieticians are able to help consumers with the overall nutrient profile of food items. Will we find a "personal dietician" at grocery stores when required in the foreseeable future?

The observational study of the products showed that there were no shelf markings in grocery stores in Finland, but for example, in Sainburys' the UK, a "traffic light" system is used; in the USA, in Supervalu, "Nutrition iQ Tags" are available for consumers on the shops' shelves (Sainsburys 2011; Supervalu 2011). Also, every other study subject pointed out that: "Products' placements do not help me to find products for weight management". Berning et al. (2010) also found positive consumer attitudes towards nutrition information on shelf labels and suggested that retailers and consumers are both able to benefit from the provision of shelf-label nutrition information. Will we find such shelf labels to guide us with nutritional issues in grocery stores in the future?

Furthermore, as Neff (2009) has reported, retailers and manufacturers have increased their efforts to research the area of 'shopper marketing perhaps because they have realized the untapped business potential of consumer welfare. If this is true, does it mean in reality that manufacturers and retailers are eager to serve this growing group of consumers who are actively engaged in weight management? Do they really think that they are supporting those consumers in the right way? Are packaging labels clear and simple enough for that group of consumers? Is it easy for consumers to find suitable products for their needs? In practice, how do we rise to the challenges together?

## Conclusions

Food choices affect an individual's intake of nutrients and thus affect their weight management. The total energy content and nutrient content of different types of food products varies enormously. Consumers have a challenging task to stay healthy and to find suitable products for their needs when

managing their weight. Researchers, dieticians and educators, as well as manufacturers, retailers and statutory authorities, are able to use the energy profiles of food product categories to help them decide what nutritional information to give consumers and in what form to show it. Energy profiles show a detailed breakdown of nutrients and this has proved to be useful to those wishing to identify which nutrients may be consumed in each product category.

The food industry and retailers have a significant role to play in supporting public welfare worldwide. The market believes that accurate and intelligent self-supporting activities on an individual health and wellness level are seen as the way forward, enhancing quality of life and reducing the cost of health care. For a consumer it is important to be able to easily find, identify and compare suitable products from a weight management point of view. Food selection should be made easier by both food industry and retail management at grocery stores and this should be supported by statutory authorities and Governments. Innovative technological solutions should be found and piloted with consumers by manufacturers working cooperatively with retailers in the areas relating to marketing psychology and communication of nutritional information. Successful consumer marketing will achieve desirable results for manufacturers, retailers and consumers as well as being of benefit the welfare of society in the long run.

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