

« DIETARY BEHAVIOUR AND FRUIT & VEGETABLE CONSUMPTION »

## Editorial

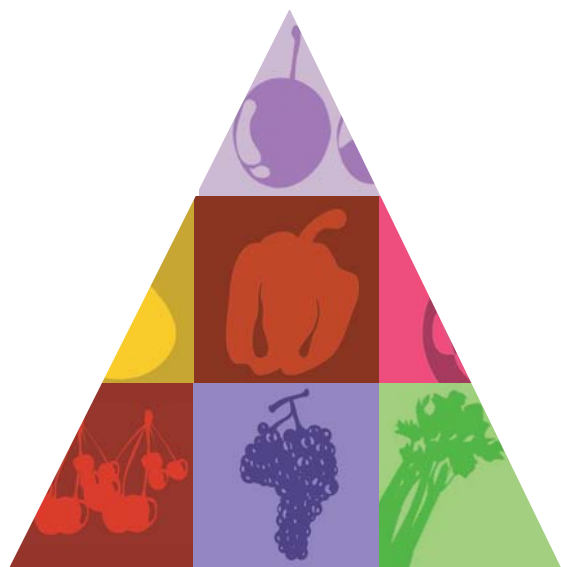
A useful guiding principle in promoting behaviour change to improve metabolic health is to 'Make the Healthy Option the Easy Option'. However, changing food behaviour habits is not easy, particularly if people feel they have to forego something they perceive to be very pleasant for something they initially think of as less pleasant. Moreover, healthy eating is often perceived by people to require large doses of cognitive restriction that demands an effort and which may weaken over time (although it should be said that some people can make this work). An interesting concept is that eating healthily does not mean eating less. Indeed it can involve eating a larger weight or volume of food. The trick is that the foods consumed must be of a lower energy density – and fruits and vegetables are ideal for this purpose. When simply incorporated into an eating pattern, fruit and vegetables lower the overall energy density (and usually also the total energy consumed), but the effect is of course much greater if they displace from the diet some high energy dense foods. A 'mindful' approach to eating is helpful, and developing a healthy snacking habit can have an impact on the overall diet composition. As with every approach however, there is not one model for all. A healthy food intake is linked to a person's body composition and to the amount of energy expended (particularly physical activity). Behaviour change is not easy; education can go so far but food knowledge alone is not enough. We need to know 'what' to change but also 'how to'. What is an easy choice for one person may not be the easy choice for another.

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*"Problems should not be interpreted as burdens; they are opportunities to show what a good person you can be".*

JB, 1996



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# Nutrition knowledge, healthy eating and dietary behavior

— Michael Siegrist —

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In Switzerland and other European countries, nutrition campaigns have been undertaken to increase population's dietary quality (5-a-day campaign). Additional intervention programs have been also designed to improve nutrition knowledge and practice of particular target groups. The present study intended to assess the procedural nutrition knowledge of Swiss consumers.

## Declarative knowledge versus procedural knowledge

In cognitive psychology, declarative knowledge is defined as knowledge about facts and things, whereas procedural knowledge is knowledge about the way in which actions are performed<sup>1</sup>. Therefore, procedural knowledge is closer to behavior than declarative knowledge. This distinction between declarative and procedural knowledge has also more recently been applied to the field of nutrition knowledge<sup>2,3</sup>.

Declarative knowledge	Procedural knowledge
Fibre content of fruit	How to compose a balanced menu
Number of calories in full fat milk	How to choose a healthier option between snacks

## Procedural nutrition knowledge and Food Frequency Questionnaire

A random Swiss population sample (n= 1,043) received a written postal survey for both healthy nutrition knowledge and self-reported food consumption. The number of correctly answered knowledge items was correlated to food consumption frequencies.

## Relations between procedural nutrition knowledge and dietary behavior

The consumers with higher procedural nutrition knowledge scores, consumed more vegetables, more fruit and more water than consumers with lower knowledge scores. Associations between demographic variables (e.g. gender, education) and nutrition knowledge replicate earlier findings<sup>4</sup>. We found a negative relationship between age and nutrition knowledge, indicating lower knowledge in older individuals. Moreover, higher knowledge was associated with females, higher education and nutrition-related qualifications. The consumers who reported following special diets prescribed by a doctor had significantly less procedural nutrition knowledge than the consumers who were not following such diets.

## Misconceptions about healthy eating

The procedural nutrition knowledge items received between 53.3% and 91.8% correct answers, indicating that most consumers were well informed about how to follow a healthy eating pattern. However, for a substantial share of the items every third to fifth participant was unable to answer correctly. We found that 35% of consumers believed that, for a

healthy diet, dairy products should be consumed in the same amounts as fruit and vegetables, whereas 19% of consumers believed that a healthy meal should consist of half meat and one quarter vegetables and side dishes. Just under one third (28%) of consumers considered that a balanced diet implied eating all foods in the same amounts, and over 17% of consumers considered that eating a diet with a high proportion of fruit and vegetables was as unbalanced as eating a diet high in fat. Many consumers (38%) agreed that to eat healthily, less fat, but not necessarily more fruit and vegetables, should be eaten.

This study highlights the fact that the food pyramid is not present in many consumers' minds and that it is not taken into account in daily food choices. According to the food pyramid, fruit and vegetables should constitute the largest part of our diet (five servings) after fluids, dairy should be consumed in smaller amounts (three servings), and meat should play an even more minor role (one serving)<sup>5</sup>. Almost 12% of respondents believed that eating healthily meant eating less, no matter which food are reduced. The literature, however, suggests that the way to maintain a zero energy balance is not primarily by eating less, but by lowering the energy density of the diet<sup>6</sup>. This can be accomplished by increasing the consumption of foods such as water-rich vegetables, fruit and cooked whole grains. Older respondents might be less familiar with the food pyramid. This might be because many of our items were based on the food pyramid, which only appeared in 1998 in Switzerland<sup>5</sup>.

Moreover, the respondents appeared to have difficulty interpreting the term 'balanced diet'. In the literature, this is defined as a diet that contains the "essential nutrients in appropriate quantities required for growth or the maintenance of health approximately each day or over a period of week"<sup>7</sup>. In practice, a balanced diet is one which is low in saturated and trans fats, cholesterol, added sugars, salt and alcohol and high in fruits and vegetables.

Poor procedural knowledge was observed in those consumers who considered that a healthy diet was equivalent to consuming vitamins. Focusing only on the consumption of vitamins is an oversimplification of the healthy nutrition concept. Some consumers considered that fruit could be replaced entirely by fruit juice or tablets. The WHO treats fruit and vegetables as a food category rather than referring to their nutrients, because the benefits of fruits and vegetables cannot be ascribed to one or several particular nutrients<sup>8</sup>.

## Conclusions

Many consumers appear to be unfamiliar with the practical implications of the food pyramid, the concept of a balanced diet and the importance of increasing fruit and vegetable consumption. Particularly older individuals and those following medically prescribed diets could profit from more education on how to compose a healthy diet. The challenge will be to find the right settings and effective ways to communicate nutrition messages to consumers.

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# Assessing behaviors associated with fruit and vegetable adequacy

— Karl Staser —

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Increased daily intake of fruits and vegetables correlates with a decreased risk for obesity, heart disease, stroke, type 2 diabetes, and certain types of cancer. Given these observations, national and local programs have promoted increased fruit and vegetable consumption. However, most Americans still do not achieve their recommended daily intake of fruits and vegetables.

A need for large scale studies of fruit and vegetable consumption and dietary behaviors. In an effort to understand factors promoting fruit and vegetable intake, various studies have examined demographic and behavioral variables associated with their consumption. Our improved understanding could inform marketing and policy strategies used in social initiatives like the CDC's "Fruits & Veggies — More Matters" program and the USDA's Supplemental Nutrition Assistance Program (SNAP).

Several large studies have assessed demographic variables such as age, sex, race, and smoking status associated with fruit and vegetable intake. Other smaller scale studies have examined the relationship between fruit and vegetable intake and particular dietary behaviors, such as dining at fast food restaurants, or dining while watching television. Using insights from these studies, we aimed to broadly assess multiple behaviors associated with fruit and vegetable adequacy while controlling for demographic variables such as age, sex, race/ethnicity, educational attainment, smoking status, and BMI. To do so, we analyzed a large cross-sectional dataset generated from a telephone survey of 4,784 adults living in Indianapolis, Indiana.

Defining fruit and vegetable adequacy in a large scale study. We were particularly interested in creating a more stringent definition of fruit and vegetable adequacy. Due to the high prevalence of obesity, we wanted to avoid simplistic approaches to adequacy, considering that a person consuming a diet replete in sodas and cheeseburgers should not be labeled "adequate" simply for also drinking five glasses of orange juice.

In order to achieve this stringency, we turned to the Healthy Eating Index 2005 (HEI-2005), a tool devised for nutrition composition monitoring and research. The HEI-2005 assigns a numerical score for diet quality relative to the number of

calories consumed. For example, a person must eat at least 0.8 cups of vegetables per 1,000 calories to receive the maximum score in the vegetable category. On a 2,500 calorie-per-day diet, then, a person must consume two cups of vegetables to achieve the maximum score.

In our analyses, we computed estimated energy requirements for each survey participant using the Harrison-Benedict equation and a multiplier for physical activity. Using these data, self-reported fruit and vegetable consumption quantities, and the HEI-2005 guidelines, we created four independent groups: those receiving the maximum score for both fruits and vegetables ("adequate"), those receiving the maximum score for fruits but not vegetables ("fruit adequate only"), those receiving the maximum score for vegetables but not fruits ("vegetable adequate only"), and those falling short in both categories ("inadequate.")



Multiple behaviors correlate with increased fruit and vegetable adequacy. Over half of our survey respondents fell within the "inadequate" category, while only about one-tenth met the criteria for adequacy. Controlling for demographic variables, we then assessed various behaviors predicting a respondent's placement within the "adequate" category versus other categories. Frequent snacking on healthy foods such as fresh fruits, vegetables, or nuts was the single best predictor for placement in the "adequate" category. Other positive predictors included frequent preparation and consumption of meals at home, frequent use of nutritional labels when purchasing food at the market, and the frequent use of symbols such as "heart healthy" icons when ordering food at restaurants. Frequent red meat consumption, by contrast, negatively predicted placement within the "adequate" category.

These results support efforts to promote healthy snacking, such as The Nemours Foundation "Smart Snacking" initiative. Likewise, our data suggest that increased "food awareness" – i.e. the use of labels and symbols – correlates with increased diet quality. In a different aspect, this study demonstrates a novel use for the HEI-2005 in combination with anthropomorphic data, whereby researchers can more precisely assess diet quality in large scale studies. This strategy is not, of course, without limitations, which are further discussed in the original research article found at [http://www.cdc.gov/pcd/issues/2011/may/10\\_0091.htm](http://www.cdc.gov/pcd/issues/2011/may/10_0091.htm).



## BASED ON:

Staser KW et al. Dietary behaviors associated with fruit and vegetable consumption, Marion County, Indiana, 2005. *Prev Chronic Dis.* 2011 May;8(3):A66.

# Losing weight without increasing cognitive dietary restraint: is it possible with an intervention promoting high intakes of fruits and vegetables?

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## Limited success of traditional weight loss interventions

Traditional weight loss interventions focus on avoiding “fattening foods”. People following this type of approach need to increase their cognitive dietary restraint (CDR) which refers to the tendency to consciously limit the type and amount of food ingested in an attempt to either lose weight or prevent weight gain. In the short term, increasing CDR is a predictor of weight loss success<sup>1</sup>. However, in the longer term, the maintenance of high CDR levels is challenging and adverse effects associated with CDR have been reported such as an increased risk of binge eating episodes<sup>2</sup>. Moreover, some studies have shown that people with a high CDR when starting a weight loss diet have poorer outcomes, since the capacity to further increase their CDR is limited. For these subjects, weight loss interventions not relying on CDR increase are needed. In that regard, positive dietary approaches focusing on the inclusion of low energy density foods such as fruits and vegetables could be considered. Therefore, the aim of our study was to compare the effects on body weight and eating behaviors between a dietary intervention avoiding restrictive messages. The approach was one of emphasizing messages directed towards an increased consumption of fruits and vegetables (HIFV) and a traditional approach with a focus on restrictive messages to limit the consumption of high-fat foods (LOFAT).

## Study design

As described in detail in previous publications from our group<sup>3-5</sup>, sixty-eight postmenopausal women with abdominal obesity were randomly assigned to one of the two six-month dietary interventions (HIFV or LOFAT) that included three group sessions and ten individual sessions with a dietitian. The HIFV intervention focused on positive messages promoting the consumption of fruits and vegetables. The LOFAT approach focused on restrictive messages about decreasing high fat food consumption in the diet. Body weight was measured before and after the six-month intervention. CDR was measured before and after the intervention with the Three-Factor-Eating-Questionnaire which assesses three factors that refer to cognitions and behaviors associated with eating<sup>6</sup>. Besides the measurement of CDR, disinhibition (overconsumption of food in response to a variety of stimuli associated with a loss of control on food intake) and hunger (food

intake in response to feelings and perceptions of hunger) were also measured.

## Body weight decreases in response to the HIFV intervention

Body weight was significantly lower at the end of the six-month intervention compared to baseline in the LOFAT group ( $-3.5 \pm 2.9$  kg) as well as in the HIFV group ( $-1.6 \pm 2.9$  kg). The LOFAT group lost significantly more weight during the intervention than the HIFV group.

## Cognitive dietary restraint is not a predictor of success in the HIFV intervention

CDR increased significantly in the LOFAT group during the intervention whereas no significant change was observed in the HIFV group. A large increase in CDR was associated with larger weight losses in the LOFAT group while in the HIFV group; changes in CDR were not associated with changes in body weight, suggesting that the HIFV approach was not relying on an increase in CDR to obtain a successful weight loss. Moreover, in the LOFAT group, women with higher baseline CDR had smaller weight loss in response to the intervention, which has also been reported by others<sup>1,7</sup>. On the other hand in the HIFV group, no association was found between baseline CDR and change in body weight, meaning that a high CDR level at baseline was not a barrier to success when following the HIFV intervention.

Disinhibition and internal hunger decreased significantly in the HIFV group while no such changes were observed in the LOFAT group. In the HIFV group, the total weight of food consumed increased in response to the intervention and this could partly explain the decrease in internal hunger observed.

## Conclusion

Following our HIFV intervention, we showed that weight loss could be achieved without increasing CDR. It could thus be argued that it is possible to lose weight without using CDR to control food intake. Therefore, our HIFV approach could be an alternative approach for women with high CDR as the success of the intervention does not rely on an increase in CDR as it is usually the case in traditional weight loss interventions such as our LOFAT approach.

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