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**ENGLISH**

# **Swiss Food Panel**

**-A longitudinal study about eating behaviour in Switzerland-**

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**Short versions of selected publications**

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Address for Correspondence

ETH Zurich

Christina Hartmann\*

Department of Health Science and Technology (D-HEST)

Consumer Behaviour CB

Universitaetstrasse 22, CHN J75.1

CH-8092 Zurich

Email: [chartmann@ethz.ch](mailto:chartmann@ethz.ch)

Telephone: +41 (0)44 632 97 47

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## **The Swiss Food Panel**

The 'Consumer Behaviour' research group of the ETH Zurich has been researching consumer behaviour since 2007. Since 2010, the research group has been conducting the Swiss Food Panel, which is a longitudinal study that covers a wide range of different topics related to eating and dietary behaviour, physical activity and lifestyle factors. The Swiss Food Panel was initiated to gain insights into changes in food choices over time, and to identify factors related to these changes. Moreover, potential target groups for further prevention campaigns and healthy lifestyle promotion should be identified.

Data collection began in 2010 with yearly follow-up periods for about five years, and the study population was randomly selected from the telephone book. More than 20,000 people were contacted in 2010, and 6,290 of those were willing to participate in the long-term study (response rate 30%). Individuals from the German-speaking and French-speaking parts (30%) of Switzerland were included in the study. In 2010, the sample consisted of 48% males, and the respondents' mean age was 54 years old (range = 20-99). Compared to the general Swiss population, fewer males participated in the study (census = 49%), more participants had a higher secondary or college/university degree, and the percentage of young adults (20-39 years old) was lower (18% vs. 27%).

## **Snack Frequency: Associations with Healthy and Unhealthy Food Choices**

Hartmann C, Siegrist M, van der Horst K. (2013), Snack frequency: associations with healthy and unhealthy food choice. *Public Health Nutrition* 16(8), 1487-96.

We examined associations between snack frequency, socio-demographic characteristics (gender, age), body-mass index (BMI) and eating behaviour. Data were based on the Swiss-Food Panel questionnaire from 2010 that was filled in by 6,189 individuals. Participants indicated how often they usually consume the following food groups: meat (beef, pork, chicken, processed meat), sweet, high-fat foods (cookies, chocolate, sweet pastries), savouries (e.g. chips), convenience food (ready-to eat food), fruits and vegetables. Additionally, the consumption frequency of sugar-sweetened beverages (e.g. Fanta, cola) was also assessed. The eating behaviour of all participants was further characterized by the frequency of main meals, the frequency of snacks (i.e. food consumption between main meals) and the frequency of main meals in front of the television. Eating related health consciousness, BMI and physical activity of more than 30 minutes per day were also assessed.

### **Women snack more than men**

A comparison of the eating behaviour of men and women showed that women eat, on average, seven snacks per week, which is more than men's average snack consumption (five snacks per week). In general, women had a higher eating related health consciousness and made better dietary food choices, indicated by a higher intake of fruits and vegetables as well as a lower consumption frequency of meat, convenience food and sugar-sweetened beverages. Additionally, women skip main meals (such as breakfast) less often.

In a second step, it was thought to investigate if differences in snack frequencies are associated with differences in food frequencies and lifestyle factors. For that purpose, the entire study population was divided into three groups (tertiles) according to their reported snack frequency per week: high, moderate and low. High frequency snack consumers ate, on average, twelve snacks per week, and low frequency snack consumers ate, on average, one snack per week. The dietary behaviours in the highest snack-frequency group were different from those in the lowest group with respect to the higher consumption frequency of all food

groups, with the exception of vegetable consumption in females. Participants in the high snack frequency group were more likely to be young women with children. In contrast, male respondents with a low snack frequency were more likely to be older, ate main meals on a more regular basis, and indicated having family meals more often than male respondents with a high frequency of snack consumption. There were no differences in the percentage of respondents who indicated that they were physically active for more than 30 minutes per week.

### **High snack frequency and food choices**

Healthy and unhealthy eating behaviours were associated with the frequency of snack consumption. A high snack frequency was, therefore, associated with a higher consumption of fruits, but also with a higher consumption of sweet, high-fat foods and savouries. Additionally, increasing snack frequency was associated with watching TV during main meals. Another significant predictor for snack frequency was age: the older the age of a person, the lower the snack frequency. BMI was not associated with snack frequency. Thus, the results of this study do not support the notion that increased snack frequency, in itself, is a cause of obesity.

### **Clusters of high frequency snack consumers**

In the final step, a cluster analysis was conducted with fruit, vegetables, meat, convenience food and sweet and savouries as clustering variables. Only high frequency snack consumers were included in this analysis. Three groups with different underlying eating patterns were identified: healthy, moderate and unhealthy groups (Figure 1). High frequency snack consumers in the healthy group were characterized by a high consumption of fruits and vegetables, and a low consumption of sweet, high-fat foods, savouries and sugar-sweetened beverages. Moreover, persons in this group indicated a higher eating related health consciousness and ate breakfast more often, compared to high-frequency snack consumers in the unhealthy group. High frequency snack consumers in the unhealthy group were more likely to be younger, ate more sweet, high-fat foods and savouries, meat and convenience food. They also reported a higher frequency of main meals in front of the television and they were less physically active, compared to the participants in the healthy group. BMI and the percentage of overweight participants did not differ between groups.

Eating pattern	Healthy		Moderate		Unhealthy	
	Lots of fruit and lots of vegetables, little sweet/high-fat snack foods, Little convenience food		Little fruit and moderate vegetables, little sweet/high-fat snack foods, moderate sugar-sweetened beverages, moderate convenience food		Little fruit and moderate vegetables, lots of sweet/high-fat snack foods, lots of moderate sugar-sweetened beverages, lots of convenience food, lots of meat and processed meat	
Characteristics	Men	Women	Men	Women	Men	Women
(Means)						
Age (years)	53	48	48	46	47	38
Children (%)	29	34	28	40	22	46
BMI (kg/m <sup>2</sup> )	25.3	23.1	25.5	23.4	24.5	22.1
Physical activity > 30 min/d (%)	67	64	64	52	69	59
	<ul style="list-style-type: none"> <li>• High eating related health consciousness</li> <li>• Main meals on a regular basis</li> </ul>		<ul style="list-style-type: none"> <li>• Moderate alcohol consumption</li> <li>• About 50% of all men and women in this group eat breakfast on a daily basis</li> </ul>		<ul style="list-style-type: none"> <li>• Low alcohol consumption</li> <li>• Main meals in front of the TV</li> <li>• High alcohol consumption in men</li> <li>• Frequent breakfast skipping</li> </ul>	

**Figure 1.** Three eating pattern groups were identified for all participants with a high consumption frequency of snacks. High frequency snack consumption occurs in the context of healthy, moderate, as well as unhealthy dietary behaviours and lifestyle patterns.

### Summary

The results indicate that the frequency of snack consumption is not associated with BMI. Additionally, a high snack frequency is not only associated with a higher consumption of sweet, high-fat foods, but also with a higher consumption of fruits. High frequency snack consumption occurs in the context of healthy, as well as unhealthy, dietary behaviours and lifestyle patterns. Therefore, high frequency snack consumption should not be labelled as unhealthy behaviour without taking the whole eating pattern into consideration.

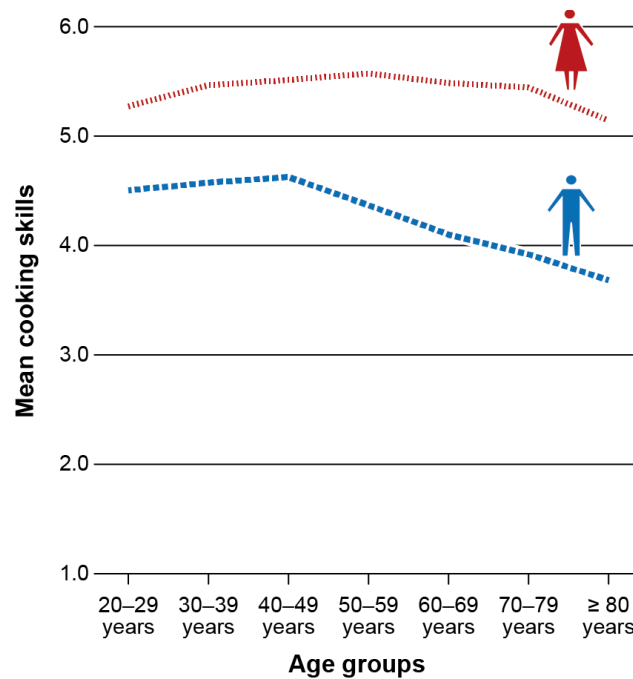
## **Importance of Cooking Skills for Balanced Food Choices**

Hartmann C, Dohle S, Siegrist M. (2013). Cooking skills for balanced food choices. *Appetite* 65, 125-131.

We designed a cooking skills scale in order to measure cooking skills in a European adult population. Furthermore, we examined which factors predict cooking skills, and investigated if there is an association between cooking skills and balanced food choices. Our study is based on data from the first (2010) and second (2011) waves of the Swiss Food Panel (4,436 participants, 47% male).

### **Women reported higher cooking skills than men**

All participants were asked if they are able to prepare a warm meal without a recipe, and if they are able to prepare different kinds of food, such as soup, gratin, cake, bread or sauce. Moreover, it was assessed who is responsible for meal preparation during the week and weekend within the household. Even though women spent less time in the kitchen than in the past, they are still mainly responsible for meal preparation in a family. Additionally, there are differences in cooking skills between gender and age groups (Figure 2). First, men reported lower cooking skills than women in every age group, and in particular, older men's cooking skills are low. One explanation might be that cooking classes for females were obligatory in the earlier years in Switzerland, while obligatory cooking classes for males started only in the 1980s. Further analysis showed that younger women, at the ages of 20 to 30 years old, reported lower cooking skills than older women. The supposed decline in the intergenerational transmission of basic cooking skills at home, and people's increasing consumption of convenience food may have led to the fact that cooking skills have become less frequently practiced.



**Figure 2.** Mean values for cooking skills plotted against age groups for males and females separately. Results indicate higher cooking skills in women than in men. Men’s cooking skills starkly decline after 40-49 years.

**Cooking enjoyment is the most important predictor for cooking skills.**

Women who enjoy cooking have higher cooking skills, independently of time or effort considerations. Interestingly, the association between cooking skills and cooking enjoyment is more pronounced in males than in females. Men’s motivation to cook might be different than women’s, because men cook when they are in the right mood and cooking, for men, is more often constructed as a fun activity than as an everyday responsibility. Another important factor for cooking skills is the presence of children. If there are children under the age of 16 years in the household, men and women are more likely to be able to cook. Parents may be more motivated to learn cooking and cook more frequently than individuals living alone.

**People who are able to cook make better food choices**

Our results suggest that there is a positive relationship between cooking skills and the consumption of vegetables. Accordingly, the higher the cooking skills are, the higher the vegetable consumption. In fact, cooking skills enable one to prepare different food items and dishes, and therefore, may increase food choice opportunities, as well as food variety. It is

well known that food variety is one factor that may increase food intake, which is preferable in the case of vegetable consumption. Moreover, people with high cooking skills less frequently consume convenience food (e.g. pizza, a meal in a can, meals ready-to eat), sweets, high-fat foods (e.g. chocolate, sweet pastries), and savoury snacks (e.g. chips), as well as sugar-sweetened beverages (e.g. Fanta, cola). Most of these food items do not need preparation skills or additional effort in advance, are comfortable, and simplify meal preparation. Unfortunately, most of these products are high in calories due to high sugar and fat contents, and with a higher consumption of these products, consumers lose control over ingredients and food safety.

### **Cooking classes in school and healthy convenience food**

Our results have further strengthened the hypothesis that people's food choices are influenced by their cooking skills. Therefore, the promotion of cooking skills should be a part of prevention strategies. Cooking classes in schools provide an opportunity to raise awareness of fresh foods, food ingredients and health-promoting diets, and might enable students to economically and quickly prepare healthy dishes. Additionally, children and young adults, especially from low-income families, might benefit most from cooking classes in schools because they have limited access to other resources of information. Therefore, cooking enjoyment should be promoted and students (especially boys) should be encouraged to develop cooking skills. There is an increasing consumer demand for ready to eat foods, in particular, men reported eating convenience foods more often. The consumers, as well as the industry, should be encouraged to focus on 'healthy' convenience foods, which are low in sugar and fat, and individuals (especially older men) with low cooking skills might profit from these ready to eat foods.



## **Time for Change? – Food Choices in the Transition to Cohabitation and Parenthood**

Hartmann C, Dohle S, Siegrist M. (2013). Time for change? – Food choices in the transition to cohabitation and parenthood (accepted).

The aim of this study was to investigate if usual food choices differ between three different household types, and to explore developmental trends in food choices following a life event. The life events under consideration were ‘moving in with a partner’ (72 persons) and ‘birth of a first child’ (65 persons). Both life events are accompanied by a rapid change in a persons’ domestic environment, and may lead to nutritional behaviour adaptations. The data used in the present study are based on the first (2010), second (2011) and third (2012) waves of the Swiss Food Panel (3,559 persons).

### **Comparison of different household types**

A cross-sectional analysis was conducted to examine if usual food consumption differs between three different household types. The household types were comprised of living alone, living in a two-adult-person household with a partner, and living in a two-adult-person household with a partner and children. Results indicate that women living in a family with children most frequently consumed the majority of all studied food groups. They reported not only the highest intake of vegetables and a high salad intake, but they also consumed poultry, processed meats, sweet, high-fat foods and savouries most often, compared to women living in one of the other household types. These findings appear to be well substantiated by the fact that children have an influence on the family’s purchasing behaviour in terms of sweets and snack foods. Increased eating cues triggered by the availability of the children’s preferred sweets in the household, and increased stress levels due to the requirements associated with a mothers’ social role, might tempt women to consume more sweets. Men’s vegetable consumption was the highest when living with a partner (with or without children). Their meat consumption, except for poultry, and their consumption of sweets and savouries, did not differ significantly between household types.

## **Developmental trends in food choices following a life event**

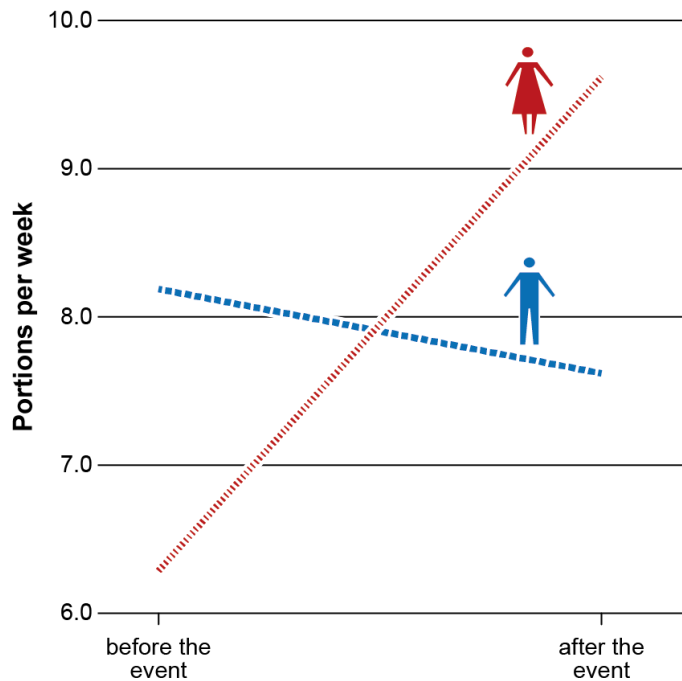
### *Moving in with a partner*

Food frequencies before and after the life event were compared for all participants who indicated that they moved in with a partner. Although the literature suggests that married men eat healthier diets due to their partners' influences, we found no indication of healthier food choices in men within one year of starting cohabitation. Even though the comparison between different household types revealed higher vegetable consumption in men living with a partner compared to men living alone, the long-term results showed no improvements in salad, vegetable or fruit consumption with the beginning of cohabitation. In contrast, men's dietary behaviours shifted to a more undesirable diet, with a higher consumption frequency of red meat, processed meats and savouries. However, it cannot be ruled out that the positive influences of a female partner, due to their more health-conscious food decisions and their role as nutritional gatekeeper, will affect men's diet positively over the long term. Women's food choices, on the other hand, changed significantly only with regard to a higher consumption frequency of processed meat after moving in together. One might speculate that women are more prone to adopt their eating styles towards men's eating styles and food preferences. Additionally, some foods are less likely to be a part of dietary convergence, because they are mostly consumed alone; independent of the partner's preferences (e.g. yoghurt). This might be the reason why fruit consumption did not change between household types or after moving in with a partner. Fruit is often consumed as snack, and therefore, an individual's snacking behaviour is likely to be more influential than a family's meal behaviour in its consumption.

### *Birth of the first child*

Another important event in a person's life is the birth of the first child. Such a life event can encourage parents, especially mothers, to change their health attitudes and to start paying more attention to their diet than they did prior to the event. In fact, vegetable consumption was much higher in women after pregnancy. They reported an average consumption of six portions per week prior to the life event, and ten portions per week after the life event (Figure 3). In contrast, men's food frequency patterns did not change after the transition to parenthood, and they only slightly decreased their beer consumption. These gender effects might be caused by the fact that pregnant women are much more likely to achieve support

and guidance through health care systems, and could be confronted with aspects of healthy eating during and after pregnancy. Increasing vegetable intake might be a strategy for women in transition to eat a more health-enhancing diet, but it could also be targeting weight loss after pregnancy, induced by body shape dissatisfaction and peer pressure.



**Figure 3.** Vegetable consumption of males and females before and after the life event ‘Birth of the first child’. Vegetable consumption is not statistically different between genders before the event. However, women increased their consumption from 6 portions per week before the event to 10 portions per week after the event. Therefore, women eat significant more vegetables after the event compared to men.

### Summary

The evidence from this study implies that in the transition to cohabitation, people are more likely to change their dietary behaviour, although both men’s and women’s food choices shifted in an unfavourable direction. This may have far-reaching consequences, because the early cohabitation period seems to be a crucial time period in which people begin creating their future family’s eating habits. The transition to parenthood seems to be an additional period in which people are more likely to implement dietary changes. The results pointed out, however, that a transition to parenthood only seems to positively influence women’s dietary

behaviours. This study highlights that life events can be a window of opportunity for a change towards better food choices, because it is more likely that people then adopt new eating behaviour strategies. Therefore, such special time periods seem to be promising with regard to the implementation of new nutritional strategies.

## **Physical Activity as a Moderator of the Association between Emotional Eating and BMI: Evidence from the Swiss Food Panel**

Dohle S, Hartmann C, Siegrist M. (2013), Physical activity as a moderator of the association between emotional eating and BMI: Evidence from the Swiss Food Panel (under review).

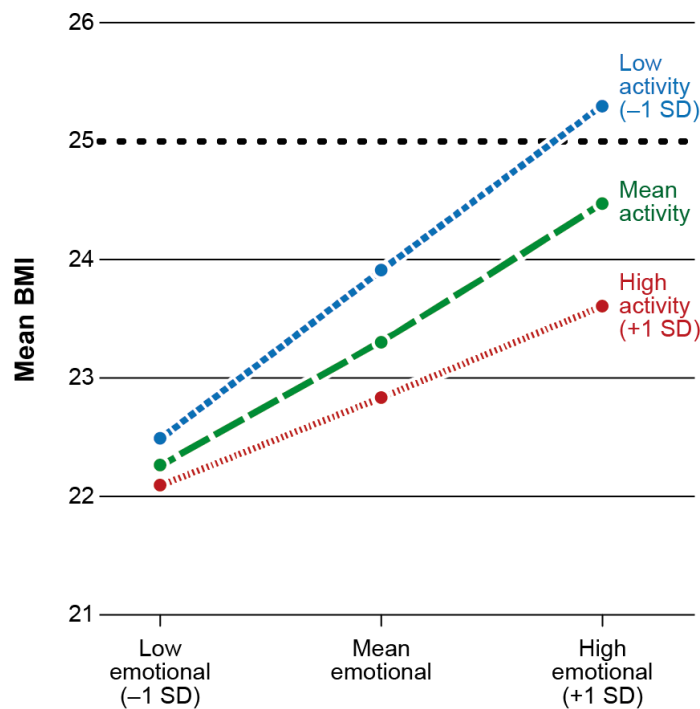
Emotional eating can be defined as the tendency to eat in response to positive or negative emotions or distress. Research has shown that emotional eaters consume sweet, energy-rich foods to regulate their emotions. As a result, emotional eating is associated with overconsumption and weight gain. In this study, it was tested whether emotional eaters who are physically active in their leisure time have lower body weights than emotional eaters who are not physically active. It is possible that recreational physical activity helps to reduce stress, and that physically active emotional eaters, therefore, eat less sweets and other energy-rich foods compared to their non-active counterparts. For this reason, we investigated food choices and body weight. Recreational physical activity was assessed via the Global Physical Activity Questionnaire, which was used for the first time in the second wave of the Swiss Food Panel (2011). Thus, the data analysis was based on the second (2011) and third (2012) waves of the Swiss Food Panel, which included 3,425 participants.

### **Emotional eaters have a higher body weight, while physically active persons have a lower body weight**

In line with other research, we found that emotional eaters have a higher body weight. A closer look at food choices showed that emotional eating was particularly related to the consumption of sweet, high-fat foods, such as chocolate, pastries and cookies. Moreover, this study demonstrated that physical activity is important for maintaining a healthy body weight. Physically active individuals had a lower body weight compared to inactive individuals, which can be explained by the fact that people who are physically active during leisure time have higher energy expenditures than persons who are not physically active.

### Physical activity attenuates the association between emotional eating and body weight

Additional analysis demonstrated that physical activity moderates the association between emotional eating and body weight. This result indicates that physically active emotional eaters have lower body weights than inactive emotional eaters (Figure 4). The data on food choices showed that physically active emotional eaters ate as many sweet, high-fat foods as inactive emotional eaters. Compared to their low-active counterparts, however, highly active emotional eaters consumed more vegetables and fruits. The results suggest that emotional eaters who are also highly active may still feel the urge to eat when under emotional distress; however, they also choose more healthy foods to cope with this distress.



**Figure 4.** Mean BMI for low, medium and high emotional eating, and different levels of recreational physical activity (3,425 persons). 1) Independent of physical activity, BMI is lower for low emotional eating compared to high emotional eating. 2) High emotional eating and low levels of physical activity are associated with a BMI > 25 (red line). 3) High emotional eating and high levels of physical activity are associated with a BMI in the normal range (green line). The activity levels (high, moderate and low) are oriented on the mean value for the whole sample; therefore, a high activity is indicated if values are in the range of plus one standard deviation (+1SD) above the mean activity. A low activity is indicated if values are in the range of minus one standard deviation (-1SD) below the mean activity.

**Implications**

Emotional eating is disadvantageous because it is related to the consumption of sweet, high-fat foods, which can lead to weight gain over time. Physical activity should be encouraged because it is related to lower body weight. Moreover, the results of this study demonstrated that physical activity could help emotional eaters to control their weight. However, it was also shown that physically active emotional eaters eat sweet, high-fat foods as often as physically inactive emotional eaters. These food choices could be disadvantageous in terms of weight management when a person is forced to stop exercising (or doing other activities) due to structural or personal changes (e.g., an injury). Prevention campaigns and interventions targeted at emotional eating should therefore focus on the intake of sweets and other energy-rich foods, and should aim at pointing out new ways of dealing with negative emotions and distress. In sum, increasing recreational physical activity could be a starting point for individuals who are prone to eating when emotionally distressed.