The Healthy Nutrition programme

Results, impact and how to proceed
Healthy Nutrition programme

In 2009 the Netherlands Organization for Health Research and Development (ZonMw) launched the Healthy Nutrition research programme. This programme aims at gaining a deeper understanding of how consumers can best be encouraged to make healthy eating choices as well as a better understanding of the links between eating patterns and the development of chronic disease. Research directed at vulnerable target groups such as children and youth, those with a low socio-economic status and ethnic minorities received priority within this programme.

Knowledge exchange

Seven research projects fitting within the programme objectives were awarded funding in 2010. Knowledge and experiences were shared early by means of meetings which were attended by members of the programme committee and by the researchers involved with the programme. These knowledge exchanges not only involved the research results themselves, but also encompassed different methodologies and other practical matters. Other subjects, including the practical implications of the granted research projects and steps that could be taken to disseminate the acquired knowledge, were also discussed.

Implementation

Valorisation of project results is important to ZonMw. Besides conducting high quality research, attention was also paid to knowledge transfer and dissemination through other means than publication in peer-reviewed journals. Even projects which concentrated on more fundamental research were encouraged to start thinking about knowledge transfer and dissemination from the beginning. Involving stakeholders and end users early on in the project was an important requirement. In this way their wishes could be taken into account throughout the entire project. Experience has shown that this involvement will prove to be invaluable when it is time to implement the results of the projects.

Project results

All research projects connected with this programme will be completed by the end of 2013. Some projects will be given the opportunity for further implementation in research, policy and practice. A new brochure will be available at our website (for addresses look at the back of brochure) in the Spring of 2014. The results of the ZonMw projects presented on the 8th of October give an impression of the progress of knowledge, innovation and evidence. These results also illustrate the knowledge gaps that need to be filled in to meet the current and future societal needs; both national and international. The involvement of ZonMw in the JPI ‘A healthy diet for a healthy life’ may contribute to meaningful steps forward in this area.

‘This project reveals that a short stop signal training targeting automatic eating-related processes can reduce impulsive responses toward high calorie foods’  (page 4–5)

‘These findings suggest that exploiting situations of low self-control is a novel and promising method to promote health on impulse’ (page 6–7)

‘It is still necessary to buy food, you don’t manage it with the food package alone’ (page 8–9)

Various aspects of the home environment are associated with children’s dietary behaviours. Some of these aspects differ by socio-economic status. (page 10–11)
Stopping automatic behaviour automatically: A new approach to changing unhealthy eating habits

Harm Veling
Radboud Universiteit
Nijmegen, the Netherlands

Henk Aarts
Universiteit Utrecht,
the Netherlands

Wolfgang Stroebe
Universiteit Utrecht,
the Netherlands

Purpose Because eating behavior is for a large part habitual and impulsive many people experience difficulty with changing their eating behavior. Therefore, an intervention is developed that targets such impulsive or habitual processes. Specifically, in this project we developed and tested a short stop signal training (SST) that presents stop signals in close temporal proximity of palatable high calorie foods in order to reduce subsequent impulsive responses toward the foods.

Methods Across different studies participants performed a training task in which behavioral stop signals were consistently (or not in the control condition) presented upon presentation of palatable foods. Next, and across different experiments, we measured choices for these foods, consumption of these foods, or people’s weight after performing the task for several weeks.

Results Results indicate that the training task is successful in reducing choices for palatable foods, reducing consumption of palatable foods, and affecting people’s body weight. These effects are primarily found among those participants that are sensitive to the impulsive qualities of palatable foods.

Conclusion These results reveal that a short stop signal training targeting automatic eating-related processes can reduce impulsive responses toward palatable high calorie foods.

Implementation We have developed a smartphone app version of the SST that is available in the App store and we are currently working to test the effectiveness of the SST in reducing food intake among different populations. In this App-version participants are asked to touch pictures with a blue border, but not with a grey border. High calorie products are always presented with a grey border during the SST (see figure).
Health on Impulse: When Low Self-Control Promotes Healthy Food Choices

Purpose Food choices are often made mindlessly, when people are not able or willing to exert self-control. Under these low self-control conditions, people have difficulties to resist palatable, unhealthy food products. Consequently, many food choices involve unhealthy ones. In contrast to previous research aiming to foster healthy choices by promoting high self-control, the present study exploits situations of low self-control, by promoting the healthy option through the use of the social proof heuristic (the tendency to adopt the option preferred by others).

Method Study 1 has a 2 (low vs. high self-control) x 2 (social proof heuristic vs. no heuristic) x 2 (trade off vs. control choice) design, with the latter as within subjects factor. 177 students (67% men) participated in this experiment in the lab. The dependent variable was the amount of healthy food choices on a food choice task. Study 2 concerns a field study, in which we manipulated self-control (high vs. low) and heuristic (social proof vs. no heuristic) in a supermarket.

Results and Conclusion In line with previous studies on self-control, the results of study 1 revealed that when no heuristic is available, people make less healthy food choices when they are low, compared to when they are high in level of self-control. However, we showed that this negative effect of self-control on food choice can be reversed: When the social proof heuristic is manipulated, low self-control individuals make more healthy food choices compared to when no heuristic is available, and even compared to individuals high in self-control. We replicated this finding in the field study in the supermarket. Again, when the social proof heuristic was manipulated, individuals low in self-control made more healthy choices compared to when no heuristic was available. These findings suggest that exploiting situations of low self-control is a novel and promising method to promote health on impulse.

Implementation In point of purchase settings, such as cafeterias, kiosks and supermarkets, the social proof heuristic can be relatively easily implemented without requiring a radical change in the decision context. An example of how the social proof heuristic can be implemented is for instance by advertising a certain product with a simple message, such as presenting a healthy sandwich in a kiosk as ‘most popular sandwich’, thereby suggesting that the majority of the people who buy their lunch at this kiosk, chose the healthy sandwich. Furthermore, since most food choices are made without cognitive elaboration, subtle changes in the food environment based on other influence heuristics, such as limited editions of healthy food products (scarcity principle), or suggesting that an authority approves a certain healthy food choice (authority heuristic), may mindlessly steer individuals towards healthy food choices.

Discussion point To what extent will heuristics pointing towards the healthy option be able to override the impulse for a palatable, but less healthy, food product? What should heuristics look like to be effective in resisting the impulse for the palatable option and promoting healthy choices?
Dietary intake of Dutch food bank recipients – preliminary results

Purpose Recipients of the food bank are a very specific group of people with low-socioeconomic status (SES), who are limited in their food choices due to their dependency on food parcels. A healthy diet can contribute to the prevention of nutrition-related chronic diseases. People with low-SES meet the dietary guidelines less often. The aim of this study is to determine dietary intake of food bank recipients. This has not been investigated in a European country before.

Methods In this cross-sectional study, socio-demographic characteristics were assessed by means of a general questionnaire and food intake by means of three 24-hour recalls per participant. Data were collected of 177 food bank recipients from 14 different food banks throughout the Netherlands.

Results Preliminary analyses of 78 participants from 9 food banks showed that carbohydrate (en%), protein (en%), saturated fat (en%), fiber (g), fruit (g) and vegetable (g) intake were not according to the dietary guidelines.

Conclusion Many food bank recipients do not meet the dietary guidelines. Interventions are needed to increase the number of food bank recipients meeting the dietary guidelines.

Implementation The content of food parcels could be adapted to better meet the dietary guidelines e.g. more basic foods like fruit, vegetables, pasta, rice, legumes, and bread and less non-basic foods such as soda and snacks.
Environmental determinants of dietary behaviours of children

Wilke van Ansem, Gerda Rodenburg, Carola Schrijvers, Dike van de Mheen. IVO, the Netherlands

**Purpose** In this project, environmental influences on dietary behaviours of children aged 8–12 years were examined. It was also examined whether these influences differ by socio-economic status (SES).

**Method** The project was an extension of the ongoing INPACT-study (IVO Nutrition and Physical Activity Child Cohort), started in 2008. The INPACT-study is a longitudinal study with a 4-year follow-up, consisting of 1,844 parent-child dyads, living in Eindhoven and surrounding areas. Participants of the INPACT-study were recruited through primary schools by the regional Municipal Health Service. In 2008, the participating children were 7-8 years old (group 5 of Dutch primary schools). Annually, parents completed a questionnaire at home on dietary intake of children and parents, characteristics of the home environment, school food environment and neighbourhood environment. Also annually, trained research assistants measured children’s height and weight at school, where children also completed a short questionnaire. A one-time food store audit was conducted in the city of Eindhoven to measure objective neighbourhood characteristics. Also, semi-structured interviews with principals and teachers were conducted to collect data on the school food policy of primary schools.

**Results** Several sub-studies were conducted. Studies on home environmental influences on children’s dietary behaviours showed a positive association between the home availability of fruit, vegetables and snacks, and children’s intake of these foods. Also, children who lived in a household where unhealthy food (e.g. candies), televisions and computers were visible and easily accessible consumed less fruit, more snacks and more soft drinks. The visibility of unhealthy foods and screens was more common among low-educated parents. Concerning parenting style, it was found that children of parents who adopted a rejecting parenting style consumed less fruit than children of parents who adopted a non-rejecting parenting style. Also, an association was found between parental modelling and children’s dietary behaviour. Positive parental modelling of food (e.g. low snack consumption), physical activity and sedentary behaviour was associated with a higher child fruit intake, and a lower child snack and soft drink intake. Positive parental modelling was more common among higher-educated parents.

A study in which the association between parental perceptions of the local food shopping environment (more specific the price, quality and availability of fruit and vegetables in shops) and children’s fruit and vegetable consumption was examined found no statistically significant associations. However, negative parental perceptions of the local food shopping environment (e.g. fruit is expensive) were associated with less fruit availability at home.

A study on the school food policy at Dutch primary schools showed that most primary schools had food rules, but in most cases they were unclearly defined. The school food policy could be improved by clearly formulating food rules and by simplifying supervision of the food rules.

In an explorative study, differences in the local food environment (e.g. price and availability of fruit and vegetables in shops) of children from various socio-economic groups were examined. No relevant differences were found.

**Conclusions** Various aspects of the home environment are associated with children’s dietary behaviours. Some of these aspects differ by socio-economic status.

**Implications** Findings were in general consistent with previous research. Correlates which are not (easily) modifiable, such as parental education level, can be important to identify specific target groups to improve children’s dietary behaviours, whereas parenting styles, parental modelling and home availability and accessibility can be important focuses in general interventions targeted at parents to improve their children’s dietary behaviours.

Results are disseminated in research articles. In addition, newsletters and presentations are given to make the results accessible for policy makers and health professionals.
Background and purpose There is a lack of validated instruments to assess the habitual diets of ethnic minorities. We aimed to develop ethnic-specific food frequency questionnaires (FFQs) to study the dietary patterns of Surinamese (African and South Asian), Turkish, Moroccan and ethnic Dutch residents of Amsterdam.

Methods An existing Dutch FFQ was adapted and formed the basis of four new FFQs. We defined similar food groups for all ethnic groups and included ethnic-specific foods. Data was collected from participants in the HELIUS prospective cohort study; a random population sample of Amsterdam residents aged 18–70 years. Dietary patterns per ethnic group were derived using Principal Component Analysis.

Results The ethnic specific FFQs are available in Dutch and translated into Turkish and Arabic. Data gathering among Turkish and Moroccan participants is ongoing. Among Dutch, Surinamese Creole and Surinamese Hindustani groups, analysis revealed three predominant dietary patterns (see Table), which explained 17.9 to 22.2% of variance in food intake. Overall, ethnic differences were found across the patterns, e.g. in Surinamese, pattern two was characterized by Surinamese vegetables and pattern 3 was characterized by Surinamese snacks and sweets. However, a number of ‘core’ food groups per pattern were similar in all groups.

Conclusions Results in the Dutch and Surinamese groups show that while there are strong similarities in eating patterns between groups, there are differences in some foods within these common patterns. These findings imply that strategies to promote healthy diets may be based on the shared characteristics of the identified dietary patterns, but it seems important to also account for differences.

Implementation The ethnic-specific FFQs are available for use in studies that aim to study the habitual diet of ethnic minorities. They are currently being employed in two other studies and are under consideration by two major cohorts. In addition, the data from this study will be used in two European studies: a study of diet and depression (MooDFOOD, EU funded); and a study of inequalities in the determinants of diet (DEDIPAC, Joint Programming Initiative). This study has provided important insights into the dietary patterns of Surinamese residents of the Netherlands. We aim to work with health promotion agencies e.g. Municipal Health Services and the Netherlands Nutrition Centre in developing culturally sensitive strategies to promote healthy eating.

Dietary pattern

<table>
<thead>
<tr>
<th>Dutch (n=1273)</th>
<th>Surinamese Creole (n=785)</th>
<th>Surinamese Hindustani (n=426)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red meat; Chicken; Processed meats; Low-fibre bread</td>
<td></td>
</tr>
<tr>
<td>Alcoholic drinks</td>
<td>Alcoholic drinks</td>
<td>Fats &amp; oils (not olive oil)</td>
</tr>
<tr>
<td>Tea</td>
<td>Fats &amp; oils (not olive oil)</td>
<td>Nuts and seeds</td>
</tr>
<tr>
<td>Sur. rice / noodles</td>
<td>Sur. rice / noodles</td>
<td>Sur. savoury sauces</td>
</tr>
<tr>
<td>2</td>
<td>Vegetables; Fruit; Olive oil</td>
<td></td>
</tr>
<tr>
<td>Pulses</td>
<td>Surinamese vegetables</td>
<td>Surinamese vegetables</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>Water Pulses</td>
<td>Water</td>
</tr>
<tr>
<td>Fish (lean and fatty)</td>
<td>Nuts and seeds</td>
<td>Fish (lean)</td>
</tr>
<tr>
<td>Eggs</td>
<td>Sur. vegetables</td>
<td>Tea</td>
</tr>
<tr>
<td>3</td>
<td>Snacks; Sugar and sweets; Cookies and cakes; Fried potatoes</td>
<td></td>
</tr>
<tr>
<td>Savoury sandwich fillings</td>
<td>Savoury sandwich fillings</td>
<td>Sur. snacks</td>
</tr>
<tr>
<td>Rice, pasta, noodles</td>
<td>Sur. snacks</td>
<td>Roti</td>
</tr>
<tr>
<td>High fibre bread</td>
<td>Root vegetables</td>
<td>Sur. snacks</td>
</tr>
<tr>
<td>Pancakes</td>
<td>Sur. vegetables</td>
<td>South Asian sweets</td>
</tr>
<tr>
<td>Sugar sweetened beverages</td>
<td>Savoury sandwich fillings</td>
<td>Sur. rice / noodles</td>
</tr>
</tbody>
</table>

Contact information
Mary Nicolaou, Phd
AMC, University of Amsterdam,
Department of Public Health
PO Box 22660
1100 DD Amsterdam
The Netherlands
m.nicolaou@amc.uva.nl
Phone +31 20 566 50 33

Bold = ethnic-specific food items.
Educational inequalities in healthy and unhealthy food choices: explanations by cultural, social and economic capital

**Purpose** To examine the contribution of cultural capital, relative to social and economic capital, to educational inequalities in unhealthy food choices.

**Methods** Data were obtained by a follow-up survey in 2011 (N=3862; response rate 67.1%; age range 31-96; 46% men) among participants of the GLOBE cohort study, including the adult population of Eindhoven and surrounding cities, Netherlands. Specific food choice outcomes, and a summary score of all unhealthy vs. healthy food choices, were constructed based on a food frequency questionnaire. Institutionalised cultural capital (e.g. education of partner, father and mother), incorporated cultural capital (e.g. cooking skills, food knowledge) and objectivised cultural capital (e.g. possession of cooking equipment) were measured with a systematically developed questionnaire, the Rotterdam Cultural Capital (ROCC) questionnaire. Economic capital (equivalent household income, having financial problems, home ownership) and social capital (social leverage, social support, number of friends, neighbourhood social network) were measured as well. In logistic regression models, associations of educational level and food choice outcomes were examined, and to what extent cultural, social and economic capital could explain these associations.

**Results** Low educated had lower levels of cultural, social and economic capital than higher educated (see Figure). Compared to higher educated, low educated were more likely to make more unhealthy than healthy food choices (OR 2.40, 95% CI 1.59-3.64; adjusted for age, sex). More specifically, low educated were more likely to not eat vegetables daily (OR 1.73, 95% CI 1.21-2.47), and to eat more unhealthy than healthy bread products (3.29, 95% CI 1.81-5.98; adjusted for age, sex), but for instance, no inequalities in fruit consumption were found. In a model including cultural, social and economic capital (adjusted for age, sex and education), only cultural capital was significantly associated with making more unhealthy than healthy food choices (1.52, 95% CI 1.27-1.83; adjusted for age, sex and education). In similar models, cultural and social capital were associated with daily vegetable consumption and unhealthy bread choices, but economic capital was not. Taking cultural capital into account reduced the odds of the low educated to make more unhealthy than healthy food choices to 1.97 (95% CI 1.29-3.01); and taking cultural and social capital into account reduced the odds of the low educated to not eat vegetables daily (to 1.28, 95% CI 0.89-1.85) and to eat more unhealthy than healthy bread products (to 2.30, 95% CI 1.25-4.24).

**Conclusions** Cultural and social capital make an important contribution to the explanation of educational inequalities in food choices, whereas economic capital seems less important.

**Discussion point** How can cultural capital be used as new entry point for intervention development?
Variation and changeability of dietary patterns: a prerequisite for public health interventions

Background and purpose For prevention of chronic diseases, it is important to investigate not only the intake of energy and single nutrients, but also the overall diet quality. We developed the Dutch Healthy Diet-index (DHD-index) based on the Dutch Guidelines for a healthy diet to reflect diet quality. In observational studies, we evaluated the DHD-index on its association with micronutrient intakes, biomarkers of intake, measures of obesity, and mortality. We also evaluated the change in diet quality during a 6-month tailored nutrition intervention in parents with school-aged children.

Methods In all studies, a food frequency questionnaire (FFQ) or 24 hour recalls were applied to assess dietary intake. In the observational studies, it was scored on eight, nine or ten components of the DHD-index resulting in a score between 0 (no adherence) and 80, 90 or 100 (complete adherence), respectively. The components included were vegetables, fruit, fish, alcoholic drinks, dietary fibre, saturated fat, trans fat, sodium, consumption occasions with acidic drinks and food, and physical activity (see Table). In the intervention study, the maximum score was 70 (without trans fatty acids, sodium, and consumption occasions). For the evaluation of the DHD-index, we used data of the Dutch National Food Consumption Survey, the European Food Consumption Validation Study, the Rotterdam Study and the NQplus study. In the intervention study, 92 parents of school-aged children received a tailored nutritional counselling and feedback via email by a dietician and were compared to 94 controls on the DHD-index.

Results The evaluation of the DHD-index showed significant positive associations with micronutrient intakes and biomarkers of intake. The index was significantly inversely associated with measures of obesity and all-cause and CVD mortality. In the intervention study, parents’ DHD-index scores increased significantly more in the intervention than in the control group (7.4 versus 0.4 points; p<0.001), and was supported by a significant decrease in waist circumference. The children of parents in the intervention group increased intake of vegetables, fish and fruit more than children of parents in the control group.

Conclusion The DHD-index is a valuable tool to assess overall diet quality and adherence to the dietary guidelines. The index was useful to evaluate the change in diet quality in the intervention study showing that parents and children in the intervention group adhered better to the dietary guidelines than those in the control group.

Implementation We additionally developed and evaluated an FFQ (the DHD-FFQ) consisting of 34 food items that can be scored using the DHD-index, and filled out in 5–10 minutes. As supported by dieticians and other professionals in a workshop, organised within the project, this may be a valuable tool to easily assess and monitor diet quality of individuals and populations in health care and research.

Table: Components of the DHD-index and their cut-off (maximum score) and threshold values (minimum score)

<table>
<thead>
<tr>
<th>Components</th>
<th>Minimum score (=0)</th>
<th>Maximum score (=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical activity (week)</td>
<td>0 activities</td>
<td>2.5 activities</td>
</tr>
<tr>
<td>2. Vegetable (day)</td>
<td>0 gram</td>
<td>200 gram</td>
</tr>
<tr>
<td>3. Fruit + fruit juices (day)</td>
<td>0 gram</td>
<td>200 gram</td>
</tr>
<tr>
<td>4. Fiber (day)</td>
<td>0 gram/4.2 MJ</td>
<td>14 gram/4.2 MJ</td>
</tr>
<tr>
<td>5. Fish (day)</td>
<td>≥15 en%</td>
<td>≤10 en%</td>
</tr>
<tr>
<td>6. SFA (day)</td>
<td>≥1 en%</td>
<td>≤1 en%</td>
</tr>
<tr>
<td>7. TFA (day)</td>
<td>&gt;7 occasions</td>
<td>≤7 occasions</td>
</tr>
<tr>
<td>8. ADF (day)</td>
<td>≥2.52 gram</td>
<td>&lt;1.68 gram</td>
</tr>
<tr>
<td>9. Sodium (day)</td>
<td>Male: ≥6 drinks</td>
<td>Female: ≥2 drinks</td>
</tr>
<tr>
<td>10. Alcohol (day)</td>
<td>Female: ≤1 drinks</td>
<td></td>
</tr>
</tbody>
</table>

SFA=saturated fat, TFA=trans fatty acids, ADF=consumption occasions with acidic drinks and foods

1 Activities were at least moderately intensive and minimally 30 minutes
2 Maximum of 100 gram of juice (six specific types) could be included
3 Fish intake was estimated based on dietary fish fatty acids (EPA+DHA) and fish oil capsules
4 The number of consumption occasions was defined as the number of hours where at least one food drink with a pH<5.5 and total acidity>0.5% was consumed.
Ethnic-specific food frequency questionnaires have been developed to assess and compare dietary patterns in different ethnic groups in the Netherlands. (page 12-13)

Cultural and social capital make an important contribution to the explanation of educational inequalities in food choices, whereas economic capital seems less important. (page 14-15)

The DHD-FFQ combined with the DHD-index is a valuable tool to assess and monitor diet quality in individuals and populations. (page 16-17)
The mission of The Netherlands Organisation for Health Research and Development (ZonMw) is to improve prevention, cure and care in the Netherlands by supporting and financing research, development and implementation.

Progress requires research and development. ZonMw funds health research and stimulates use of the knowledge developed to help improve health and health care.

The Healthy Nutrition programme is one of the research programmes of ZonMw, on the authority of the Ministry of Health, Welfare and Sport and the Ministry of Economic Affairs.