Involvement, competencies, gender and food health information seeking

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Abstract
Purpose – The purpose of this paper is to empirically investigate the role of gender, food health involvement, and food health information competency in predicting consumer food health information seeking.

Design/methodology/approach – A conceptual model for predicting consumer food health information seeking is proposed. The predicting constructs are general food health involvement, general food health competency, product-specific health involvement, and product-specific food health competency. The relationships between construct are estimated using structural equation modelling. Data were collected in a nationally representative consumer-panel among 504 Danish consumers using a questionnaire.

Findings – The results suggest that improving consumers’ general food health involvement may only lead to increased product-specific health information seeking if consumers at the same time are involved in the specific product category. The results also revealed that women are generally more food health involved than men but did not support previous research suggesting that women also are more knowledgeable about healthy food and that they more often seek product-specific food health-related information.

Research limitations/implications – This research concentrated on analysing one food product, salad dressing. A large cross-section of products ought to be studied to improve the generalizability of the obtained result and thus future research may wish to incorporate a wider range of food products.

Practical implications – The results suggest that food authorities and/or food marketers seeking to promote a healthy life-style should consider providing examples of healthy product categories (food authorities) and/or particular products (food marketers) along with their general health information.

Originality/value – This paper empirically investigates gender along with a number of mental constructs for the purpose of understanding consumers’ food health information seeking. Also, the paper explores age and educational level as possible moderating variables of the consumer food health information seeking process.

Keywords Food products, Gender, Public health, Customer information, Information retrieval, Competences

Paper type Research paper

Introduction
Because of overweight and obesity both authorities and consumers in most industrialized countries have become increasingly concerned about health issues related to their food intake (Smed and Jensen, 2005; Nordic Council of Ministers, 2006). One way for authorities to support healthy food intake is by means of food labelling. A recent Nordic survey on consumer’s attitudes towards food labelling found that 83%...
percent of the Nordic consumers consider information about health-related contents as very or quite important (Nordic Council of Ministers, 2006). However, information concerning the healthiness of the food product – as for instance the amount of saturated fat in a product – can only guide consumer’s food choice if consumers seek the information on a food product. Unfortunately, due to the consumer’s scarce resources (time, mental capacity, and money) health information seeking may not always take place in the market environment (e.g. Supermarket Business Magazine, 1997; Hansen, 2007). From an individual psychological perspective consumer information seeking propensity may be seen as a consequence of consumer involvement and competencies in relation to food health information. For example, consumers’ who are more involved in food health issues may be more inclined to seeking food health information (Okechuku, 1992). While the consumers’ interests and competencies can be expected to impact their information seeking, gender has also been proposed as an important exploratory variable (e.g. Ares and Gámbaro, 2007; Beardsworth et al., 2002; Carels et al., 2007; Oakes and Slotterback, 2001). Studies investigating the role of gender and information-seeking suggest as a general observation that men are more task- or goal-oriented and women are more relationship oriented (Babin and Boles, 1998; Eagly et al., 1995). This distinction between the two sexes impacts how each gender observes the environment, processes, evaluates and retrieves information, and makes judgments. For example, women tend to be highly detail-oriented and process a larger amount of information for decision making, while men are more inclined to use simple heuristics and process less information (Karatepe et al., 2006; Sunden and Surette, 1998; Campbell, 1997). This study sets out to investigate the role of consumer gender, food health involvement, and food health information competency in relation to explaining consumer food health information seeking. In addition, since food health interested consumers are generally known to be older than average and to have a higher educational level (Rimal et al., 2000; ATV, 2007), we also investigated whether age and educational level will moderate the influence of gender, health information involvement, and health information competencies on consumers’ propensity to seek food health information.

The focus of gender as a predicting variable relates to females still being the principal food buying agents for households (Hansen and Stubbe Solgaard, 2004). Moreover, research suggests that compared to women, men are more likely to see shopping as being unpleasant and undesirable, spend less time shopping, less likely to take responsibility for food purchases and more likely to make quick decisions (Bakewell and Mitchell, 2006; Miller, 1998; Dholokia, 1999; Campbell, 1997). Research also indicates that the role of gender in consumers’ information seeking processes may be moderated by age and education. For example, young males may be more involved in the food shopping process than their older counterparts (Dholokia, 1999) and well-educated female consumers’ may be more likely to seek health-related information than other demographic consumer segments (Strebel et al., 2004).

The main concepts of this paper are general and product-specific food health involvement and competencies, respectively. Similar concepts are found in other theoretical models. For example, health involvement is equivalent to health motivation as conceptualized in the “preventive health care model” (Jayanti and Burns, 1998), whilst the concept of competencies is quite similar to “self-efficacy” in the “health belief model” (e.g. Burns, 1992). However, since the present research concerns consumers’ information seeking behaviour we have chosen to name our concepts “involvement”
and “competencies”, respectively, as these names reflect the terminology most often used within this research area (e.g. Hibbard et al., 2007; Celsi and Olson, 1988).

The paper is organized as follows. First, a conceptual model for understanding consumer health information seeking behaviour is proposed. Next, the research methodology is developed. Then, the obtained results are presented. Finally, we discuss the implications of the study and provide suggestions for further research.

Conceptual model and research hypotheses
This section develops a conceptual model for understanding the role of gender, food health involvement, and food health information competency in explaining consumer food health information seeking (Figure 1).

The model is derived from various suggestions and evidence concerning gender and consumer food choice behaviour offered in the literature and proposes possible links between several latent variables related to consumer food health behaviour: general food health involvement, general food health competency, product-specific health involvement, product-specific food health competency, and product-specific health information seeking (e.g. Carels et al., 2007; Hansen, 2005; Oakes and Slotterback, 2001; Vartanian et al., 2007). In addition, gender is included in the model as this observed variable may possibly influence the other constructs. The rationale for the model is outlined in the following.

General food health involvement
A person’s feeling of personal relevance is the motivation to search for, acquire and process stimulus-relevant information. Celsi and Olson (1988) refer to this motivational state as felt involvement. In general, most consumer researchers view perceived personal importance and relevance as the essential characteristics of involvement (e.g. Blackwell et al., 2006; Celsi and Olson, 1988). General food health involvement we therefore conceptualize as the degree of personal importance and relevance a consumer in general attach to healthy food intakes. In a situation of high perceived involvement the

<table>
<thead>
<tr>
<th>Consumer gender</th>
<th>Consumer mental constructs</th>
<th>Consumer information seeking</th>
</tr>
</thead>
<tbody>
<tr>
<td>H11(+)</td>
<td>H4(+)</td>
<td>H6(+), H8(+)</td>
</tr>
<tr>
<td>H10(+)</td>
<td>H3(+)</td>
<td>H7(+)</td>
</tr>
<tr>
<td>H12(+)</td>
<td>H1(+)</td>
<td>H9(+)</td>
</tr>
<tr>
<td>H13(+)</td>
<td>H5(+)</td>
<td></td>
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<tr>
<td>H14(+)</td>
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Figure 1. Conceptual model for understanding consumer food health information seeking

Food health information seeking
A distinction should be made between intrinsic involvement, which is stable and enduring, and situational involvement, which is transient (Celsi and Olson, 1988). The first derives from enduring personal involvement (like general food health involvement) to the consumer while the latter derives from transitory environmental cues (like involvement in the healthiness of a specific food product, which the consumer considers to purchase). Both are sources of perceived involvement. It is reasonable to assume that intrinsic involvement (the general motivation to process) affect consumer situational health involvement and health information processing for a particular food product (Okechuku, 1992). Hence, we hypothesize as follows:

**H1.** General food health involvement is positively related to general food health competency.

**H2.** General food health involvement is positively related to product-specific health information seeking.

**H3.** General food health involvement is positively related to product-specific health information competency.

**H4.** General food health involvement is positively related to product-specific health involvement.

*General food health competency*

Prior knowledge can be regarded as the amount and organization of cognitive representations about a topic (like food healthiness). These representations are encoded and organized in memory as a topic-related cognitive structure or schema (Okechuku, 1992). The more highly developed the cognitive structure, the more knowledgeable and competent the individual is about the topic in question (Zinkhan and Muderrisoglu, 1985). Evidence (Zinkhan and Braunsberger, 2004) also suggests that a well-developed competence structure is likely to reduce perceived complexity and to increase perceived competency towards particular decision problems. Moreover, as stated by Jayanti and Burns (1998, p. 9):

[... it is generally believed that knowledge facilitates information search, and highly knowledgeable consumers acquire and retain more information compared with people with less knowledge.]

We therefore hypothesize:

**H5.** General food health competency is positively related to product-specific health information competency.

Also, it can be expected that consumers who regard themselves as competent evaluators of food health information are more likely to find product-specific health information useful and thus will seek such information.

**H6.** General food health competency is positively related to product-specific health information seeking.
Product-specific food health involvement
We conceptualize product-specific food health involvement as the degree of personal importance and relevance a consumer attach to purchasing and consuming a healthy variant of a specific food product. We expect consumers who are involved in a certain product category to more likely to develop competencies with that category than less involved consumers. Also, consumers who find a product category to be relevant and important should be more likely to search for information concerning that category (e.g. Blackwell et al., 2006).

H7. Product-specific health involvement is positively related to product-specific health competency.

H8. Product-specific health involvement is positively related to product-specific information seeking.

Product-specific food health competency
Perceived choice competency can be conceptualized as the perceived easiness of transforming information (e.g. nutritional information printed on the food package) into knowledge in a certain choice situation (Hansen and Thomsen, 2006) and therefore lack of/reduced competency may add uncertainty to the choice situation. For the purpose of reducing choice complexity, consumers may expand their search for information. The more competently the consumer feels s/he can evaluate product-specific health information search the more inclined the consumer may be to search for such information. Therefore, we expect the relation between product-specific health information competency and product-specific health information seeking to be positive. It is therefore hypothesized that:


Gender
Gender has often been used as a stereotype characteristic (see Vartanian et al., 2007). For example, consumers who eat smaller meals and healthy foods are often referred to as “feminine”, whereas those who eat larger meals and unhealthy foods are referred to as “masculine”. There is some evidence that women and men may be socialized to eat differently and that they might view food differently. Compared to men, women tend to consider themselves to have a healthier food intake, to be more knowledgeable about healthy food and to read nutritional labels more often (Carels et al., 2007; Oakes and Slotterback, 2001). Also, men’s eating habits are more likely to be influenced by their spouse, as compared to the other way around (Bock et al., 1998). This notion is in line with findings showing that women are still responsible for carrying out the major part of household food shopping and cooking (Hansen and Stubbe Solgaard, 2004).

In a study of consumers’ choice of functional food Ares and Gambaro (2007) found that women showed a more positive attitude towards concepts enriched with “healthy components” like fibre and iron, than men. Other results suggest that women are more concerned than men about reducing salt and fat in their food intake and that women more often prefer to eat fish, fruit and vegetables (Berg, 2004). Moreover, Berg (2000) found that female consumers more often enjoy reading about food-related issues:
H10. Women have a higher level of general food health involvement than men.

H11. Women have a higher level of product-specific food involvement than men.

H12. Women show a higher degree of product-specific health information seeking than men.

H13. Women have a higher level of general food health competency than men.

H14. Women have a higher level of product-specific food health competency than men.

Methodology

Measurements

Multiple item seven-point Likert scales (1 = Disagree totally; 7 = Agree totally) were applied for each of the five theoretical constructs used in this study. In addition to the input obtained from the pre-test (see next section) we also draw on previous research. In measuring “general food health involvement”, “product-specific food health involvement” “general food health information competency” and “product-specific health information competency” we draw on numerous authors, including Beatty and Talpade (1994), Berg (2007), Grønhøj (2007), and Westbrook (1980). To measure “product specific health information seeking” we draw on dimensions identified by Moorthy et al. (1997). The applied measurements are shown in the Appendix.

Pre-test – initial verification of measurement scales

Overall, 220 undergraduate and graduate students and 90 members of a consumer research community, all associated with a large Scandinavian Business School, were contacted for the purpose of pre-testing the applied constructs (and for the purpose of selecting an appropriate food product type). A total of 143 questionnaires were returned. When corrected for non-responses a usable sample of 89 was identified. On each of the multi-item scales a three-step item purification procedure was conducted. First, an exploratory factor analysis was conducted for each of the constructs using an eigenvalue of 1.0 as the cut-off point. Second, inter-item and item-to-total correlations were computed for each item. All items should have a significant correlation coefficient at the 0.01 level. Third, Cronbach’s alpha was computed for each of the constructs. In case of a low alpha value (< 0.70) the lowest item-to-total correlation was removed until the alpha value was > 0.70 for each of the constructs. This procedure deleted three items from the measurement scales. With these items deleted, all constructs showed Cronbach alphas > 0.70 and all inter-item and item-to-total correlations were significant at the 0.01 level. Thus, no further corrections were made on the applied measurement scales. The application of the described procedure on the survey-data resulted in the removal of two additional items. These items are marked in the Appendix.

The following criteria guided the selection of the food product. First, the selected food product should not require any complex cooking procedure in order to facilitate that respondents’ assessments of involvement and competency are made in relation to the food product and not in relation to a subsequent cooking procedure. Second, the food product should have the potential of creating sufficient variations in consumers’ assessments of food health involvement, perceived food health competency, and food
health information seeking. The pre-test suggested that salad dressing had such a potential.

Data collection
Data were collected in a nationally representative consumer-panel among 504 Danish consumers using a web-based questionnaire. In total, 1,050 consumers were contacted resulting in a response rate of 48 percent. The data collection was carried out by the market research agency ACNielsen. All respondents were screened to make sure that they regularly carry out food shopping. Of the respondents, 50.6 percent were women, the average household size was 2.34, and the average age was 44.6 years and ranged between 18-77 years with a fairly normal spread.

Results
Specification of the investigated model
The conceptual model in Figure 1 was translated into a Lisrel model consisting of a measurement part (confirmatory factor analysis, CFA) and a structural equation part (simultaneous linear regression). The relationships between the variables were estimated by maximum likelihood estimation. The framework was tested using a two-stage analysis. First, conducting confirmatory factor analysis on the applied multi-item scales developed the measurement models. Next, the measurement models and the structural equation paths were estimated simultaneously to test the proposed model (overall model). This two-stage method is applied to ensure that the measures of the constructs are reliable and valid before conclusions about relations between constructs are carried out.

Validation of the measurement model
CFA was used to investigate construct reliability and verify measurement reliability for general food health involvement, general food health information competency, product-specific health information involvement, product-specific health information competency, and product-specific health information (Table I).

The root mean square error of approximation (RMSEA = 0.08) and the comparative fit index (CFI = 0.94) show an acceptable degree of fit of the measurement model. The parsimony of the model is confirmed with the value of the normed chi-square ($\chi^2 = 198.07/df = 68$) = 2.91 falling within the recommended thresholds of 1 to 3 (Hair et al., 1998). The expected relationships between constructs and their indicators are supported with all items significantly related to their constructs. The reliabilities all exceeded 0.70 and thus indicate a good reliability of each the measured constructs. Convergent validity of individual constructs in the model is confirmed because the mean of the squared factor loadings is equal to or greater than 0.5 for all latent constructs. Comparing the baseline measurement model to alternative models in which the covariances between pairs of constructs were constrained to unity initially tested discriminant validity (Anderson and Gerbing, 1988). In seven of the investigated ten cases, the constrained model produced a significant increase in chi-square value ($p$-value < 0.05), demonstrating the existence of sufficient discriminating validity for these cases. Insignificant increases in chi-square values were detected between general food health involvement with respect to its pair wise covariance with product-specific health involvement, general food health competency, and product-specific health information seeking, respectively. However, as paths from general food health
involvement to each of three mentioned constructs were hypothesized, the results are not surprising and should not in itself be regarded as violations of discriminant validity. In order to further investigate discriminant validity the method proposed by Fornell and Larcker (1981) was applied for the three relations. The extracted variance for each of the individual construct was for all three relations greater than the squared correlation between constructs suggesting that sufficient discriminant validity is obtained.

### Hypotheses testing

Standardized beta-coefficients from the estimated structural model are reported in Table II along with the associated $t$-values for each construct. The applied fit measures

<table>
<thead>
<tr>
<th>Construct/indicator</th>
<th>Standardized factor loading$^a$</th>
<th>Critical ratio</th>
<th>Construct reliability</th>
<th>Convergent validity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General food health involvement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X1 General food health interest</td>
<td>0.89</td>
<td>17.50</td>
<td>0.91</td>
<td>0.78</td>
</tr>
<tr>
<td>X2 Importance of living a healthy life</td>
<td>0.82</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3 Relevance of food and healthiness</td>
<td>0.93</td>
<td>18.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General food health competency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4 Ability to find healthy food products</td>
<td>0.66</td>
<td>–</td>
<td>0.74</td>
<td>0.59</td>
</tr>
<tr>
<td>X5 Perceived general competence</td>
<td>0.87</td>
<td>9.00</td>
<td>0.85</td>
<td>0.65</td>
</tr>
<tr>
<td><strong>Product-specific health information involvement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X6 Seeking healthiest salad dressing</td>
<td>0.80</td>
<td>11.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X7 Importance of finding a healthy salad dressing</td>
<td>0.91</td>
<td>13.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X8 Effort to prevent buying an unhealthy salad dressing</td>
<td>0.70</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product-specific health information competency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X9 Difficulty in evaluating health information concerning salad dressing</td>
<td>0.83</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X10 Unsure what to look at when assessing the healthiness of salad dressing</td>
<td>0.82</td>
<td>14.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X11 Complex to choose a salad dressing based on healthiness</td>
<td>0.60</td>
<td>10.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product-specific health information seeking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X12 Scan salad dressing package for health information</td>
<td>0.78</td>
<td>13.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X13 Use information found on salad dressing package</td>
<td>0.78</td>
<td>14.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X14 Rarely spend time seeking salad dressing health information</td>
<td>0.83</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $^a$One item for each construct was set to 1

Table I.
Confirmatory factor analyses results
indicate that the specified path model provides a sufficient fit to the data ($\chi^2 = 218.98$, df = 78, $\chi^2$/df = 2.81; GFI = 0.90; CFI = 0.93; RMSEA = 0.08).

Overall, eight of the 14 proposed hypotheses were supported. It was proposed that general food health involvement would be positively related to general food health competency ($H1$). This proposition is confirmed (standardized coefficient of 0.614, $p$-value < 0.001). $H2$ was not confirmed in the study, as general food health involvement did not affect product-specific food health information seeking (standardized coefficient of -0.134, $p$-value = 0.099). From $H3$ we expected that general food health involvement would positively affect product-specific food health information competency. This expectation was supported as we obtained a positive relation between constructs (standardized coefficient of 0.234, $p$-value = 0.042). $H4$ is supported, as general food health involvement positively affected product-specific food health involvement (standardized coefficient of 0.553, $p$-value < 0.001). $H5$ was confirmed as general food health competency was significantly related to product-specific food health competency (standardized coefficient of 0.410,
\( p\)-value < 0.001). \( H6 \) is supported with general food health competency positively related to product-specific food health information seeking (standardized coefficient of 0.160, \( p\)-value = 0.038). \( H7 \) predicted that product-specific food health involvement would positively affect product-specific food health competency. This prediction was not confirmed in the study (standardized coefficient of 0.047, \( p\)-value = 0.592). \( H8 \) was accepted with product-specific food health involvement positively related to product-specific food health information seeking (standardized coefficient of 0.826, \( p\)-value < 0.001). Product-specific food health competency positively affected product-specific health information seeking (standardized coefficient of 0.216, \( p\)-value < 0.001) and thus \( H9 \) was supported. Women had a higher level of general food health involvement than men (standardized coefficient of 0.232, \( p\)-value < 0.001) supporting \( H10 \). The mean of general food health involvement was for women 5.60, whereas the mean for men was 4.95. However, there were no gender difference in relation to the constructs of product-specific food health involvement, product-specific food health information seeking, general food health competency and product-specific food health competency; hence \( H11 \) to \( H14 \) were not supported.

**Mediating effects**

The specified path model (refer to Figure 1) suggests that four constructs (general food health involvement, general food health competency, product-specific food health involvement, and product-specific food health competency) may each mediate the relation between gender and product-specific health information seeking. In addition, the path model suggests that general food health competency and product-specific health competency, respectively, may mediate the relation between general food health involvement and product-specific health information seeking. Also, it is suggested that product-specific food health competency may mediate the relation between product-specific food health involvement and product-specific health information seeking. Finally, the path model suggests that product-specific food health competency may mediate the relation between general food health competency and product-specific health information seeking. To verify these suggestions at the overall level, the model was initially compared against a baseline model in which all the five constructs found in Figure 1 were allowed to affect product-specific health information seeking – and in which no mediating constructs were specified. A chi-square difference test between the two models (\( \Delta \chi^2 = 209.1, \Delta df = 9; p\)-value < 0.001) clearly suggested that the specified path model is superior to the baseline model. Therefore, the mediating (indirect) effects can be calculated and evaluated on the basis of the specified path model. In the following only significant indirect effects, which are related to accepted hypotheses (that is, both relations included in the estimation of a specific indirect effect must have received acceptance) are outlined. Gender influenced general food health involvement, which however, in turn did not affect product-specific information seeking. Therefore, no indirect effects involving gender were significant. However, when disregarding gender the indirect effect of general food health involvement on product-specific food health information seeking through product-specific health involvement was significant (0.553 × 0.826 = 0.457; \( p\)-value = 0.010). Also, the indirect effect of general food health competency on product-specific health information seeking through product-specific health competency was significant (0.410 × 0.216 = 0.089; \( p\)-value = 0.027).
Moderating effects of age and education

For the variable “age” the sample was median split in two subgroups. The variable “education” was split into “no high-school degree” and “high-school degree or higher”. For both pairs of subgroups the number of respondents was fairly equal (Table III). To test if the measurement models were the same across groups, four separate two-group model-analyses were conducted. Two models were unconstrained and two models were estimated with the constraint that the loadings for the indicator variables on their respective latent variables are the same across subsamples. The fit measures were similar for both the constrained and the unconstrained analyses. The values of CFI were in all models above 0.90 and the values of RMSEA were in all cases between 0.06-0.07. For the purpose of testing the equality of the structural paths constrained and unconstrained models the multi-group procedure suggested by Jöreskog and Sörbum (1993), and recently used by Hansen (2005), was adopted. The values of Akaike's Information Criterion (AIC) were 625.57 (model with no subgroups), 540.00 (model with age divided into subgroups) and 525.20 (model with education divided into subgroups), respectively, indicating that the split into sub-samples is meaningful. Thus, the individual paths could then be separately examined across subsamples. Using a chi-square difference test it is tested whether the estimated path coefficients are equal. Table III displays the results of the unconstrained models.

The findings of the conducted multi-group procedure showed no moderating effects of educational level on any of the path coefficients in the model. In contrast, two moderating effects were detected for age. General food health competency was found to significantly affect product-specific food health information seeking for younger consumers ($\beta = 0.265$, $p$-value = 0.024) but not for older consumers. Additionally, gender was found to affect product-specific health information seeking for older consumers ($\beta = 0.141$, $p$-value = 0.032) but not for younger consumers.

Discussion

This research included both general (gender, general food health involvement, general food health competency) and product-specific (product-specific health information competency, product-specific health involvement) constructs related to food consumers’ health information seeking behaviour. The results suggest that consumers’ health involvement on the general level affect consumers’ general food health competency. That is, when consumers’ are motivated to gain additional insights in food health related issues they are also more likely to develop general food health competencies. The results also reveal that more women than men are food health involved. This has implications for food authorities seeking to change consumers’ food behaviour by information campaigns and the like. Such information may most likely be read by (especially female) consumers’ who are already well informed about food health issues. On the other hand, less motivated consumers tend to be less likely to develop improved food health competencies. Therefore, as well as providing information food health information food authorities need to motivate consumers to be involved with food health issues.

General food health involvement had no direct effect on product-specific health information seeking. However, the indirect effect of general food health involvement on product-specific food health information seeking through product-specific health involvement was significant. This suggests that improving consumers’ general food
health involvement may only lead to an increased product-specific health information seeking if consumers at the same time are involved in the specific product category. This means that food authorities and/or food marketers seeking to promote a healthy life-style may consider providing examples of healthy product categories (food authorities) and/or particular products (food marketers) along with their general health information.

### Table III.
Multigroup analyses results for education and age

<table>
<thead>
<tr>
<th>Path from/to</th>
<th>Education</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No high school</td>
<td>Low (&lt;44)</td>
</tr>
<tr>
<td></td>
<td>n = 232</td>
<td>n = 250</td>
</tr>
<tr>
<td>General food health involvement → general food health competency (H1)</td>
<td>0.635(^a)</td>
<td>0.625(^a)</td>
</tr>
<tr>
<td>General food health involvement → product-specific food health information seeking (H2)</td>
<td>−0.187</td>
<td>−0.070</td>
</tr>
<tr>
<td>General food health involvement → product-specific food health information competency (H3)</td>
<td>0.316(^b)</td>
<td>0.313</td>
</tr>
<tr>
<td>General food health involvement → product-specific food health involvement (H4)</td>
<td>0.523(^a)</td>
<td>0.638(^a)</td>
</tr>
<tr>
<td>General food health competency → product-specific food health information competency (H5)</td>
<td>0.458(^a)</td>
<td>0.456(^a)</td>
</tr>
<tr>
<td>General food health competency → product-specific food health information seeking (H6)</td>
<td>0.147</td>
<td>0.265(^a)</td>
</tr>
<tr>
<td>Product-specific health involvement → product-specific food health competency (H7)</td>
<td>0.096</td>
<td>0.004</td>
</tr>
<tr>
<td>Product-specific health involvement → product-specific food information seeking (H8)</td>
<td>0.981(^a)</td>
<td>0.733(^a)</td>
</tr>
<tr>
<td>Product-specific health information competency → product-specific food health information seeking (H9)</td>
<td>0.193(^b)</td>
<td>0.216(^a)</td>
</tr>
<tr>
<td>Gender → general food health involvement (H10)</td>
<td>0.274(^a)</td>
<td>0.328(^a)</td>
</tr>
<tr>
<td>Gender → product-specific food health involvement (H11)</td>
<td>0.010</td>
<td>0.043</td>
</tr>
<tr>
<td>Gender → product-specific food health information seeking (H12)</td>
<td>0.026</td>
<td>0.102</td>
</tr>
<tr>
<td>Gender → general food health competency (H13)</td>
<td>0.059</td>
<td>0.044</td>
</tr>
<tr>
<td>Gender → product-specific food health competency (H14)</td>
<td>−0.055</td>
<td>0.048</td>
</tr>
</tbody>
</table>

Notes: *P*-value < 0.01; **P*-value < 0.05. Standardized coefficients, which are unequal across the two groups at the 0.05 level, are shown in italics. No group differences were significant at the 0.01 level. Only group-differences in which at least one coefficient is significant are marked.
Improving consumers’ general food health competency has both direct and indirect (i.e. the effect of general food health competency on product-specific food health information seeking through product-specific food health competency) positive consequences on product-specific food health information seeking. Also, consumers may be health involved without at the same time having developed sufficient general health competencies to have an increased propensity to seek product-specific food health information (i.e. the indirect effect of general food health involvement on product-specific information seeking through general food health competency was not significant). This illustrates that food involvement and food competencies are two separate constructs and underlines that improving food health involvement may not in itself lead to an increased propensity to seek product-specific food health information. Thus, food authorities should consider establishing food health educational programmes in order to facilitate an increase in product-specific food health information seeking.

Gender showed only modest effects on the various constructs included in the study. While we found that women are generally more food health involved than men, our general results did not support other findings (Carels et al., 2007; Beardsworth et al., 2002; Oakes and Slotterback, 2001) suggesting that women are more knowledgeable about healthy food and that they more often seek product-specific food health-related information. However, when allowing age to moderate the results we found that older, female consumers are more inclined than younger female consumers to seek product-specific health information. The results also revealed that the relation between general food health competency and product-specific food health information seeking was only significant for younger consumers. This suggests that the effect of an information campaign seeking to improve general health competency may have the largest positive effect on product-specific food health related information seeking for younger consumers. We found no evidence that education could moderate any of the relations specified in our model suggesting that the effect of the actions discussed above may be consistent regardless of consumers’ educational level.

This research concentrated on analysing one food product, salad dressing. A large cross-section of products ought to be studied to improve the generalizability of the obtained result and thus future research may wish to incorporate a wider range of food products. As with much research, this study provides a snapshot of consumer behaviour rather than a longitudinal study. Thus, when considering the findings obtained in this study one should be aware that the consumer food health behaviour is still evolving and that research concerning this issue – as is the case with much other consumer research – needs to be continuously repeated and modified.

References
ATV, Akademiet for de Tekniske Videnskaber et al. (2007), Økonomiske virkemidler i ernæringspolitikken – et brugbart værkøj i indsatsen mod fedme og dårlig ernæring?, rapport maj (in Danish).


Appendix

Items used to measure the constructs applied in the study.

1. General food health involvement. X1: In general, I'm very interested in healthy food products\(^a\). X2: Living a healthy life is very important to me\(^a\). X3: Food and healthiness is highly relevant to me\(^a\).

2. General food health competency. X4: I can easily distinguish between healthy and unhealthy food products\(^b\). X5: When it comes to carrying out healthy food shopping I'm highly competent\(^b\). Xdel: During shopping it is often difficult for me to spot healthy food products\(^b,d,e\).

3. Product-specific health information involvement. X6: I don't usually try to find the healthiest salad dressing\(^a,e\). X7: Choosing a healthy salad dressing means a lot to me\(^a\). X8: I will do a lot to prevent buying an unhealthy salad dressing\(^a\).

4. Product-specific health information competency. X9: It is difficult for me to evaluate information concerning the content of different types of salad dressing\(^b\). X10: I'm not sure what to look at when assessing the healthiness of various types of salad dressing\(^b\). X11: It is very complex for me to choose between various types of salad dressing based on the degree of healthiness\(^b,e\).

5. Product-specific information seeking. X12: Before choosing a salad dressing I normally scan the package to find information about its healthiness\(^c\). X13: When choosing a salad dressing I normally use the information concerning healthiness found on the package\(^c\). X14: I rarely spend time seeking information about the healthiness of salad dressing\(^c,e\).

\(^a\) Item derived from Beatty and Talpade (1994) and Celsi and Olson (1988).
\(^b\) Item derived from multiple sources (Berg, 2007; Grønhøj, 2007; Westbrook, 1980).
\(^c\) Item derived from Moorthy et al. (1997).
\(^d\) Item deleted.
\(^e\) Item inverted.

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