Post-purchase Stress in the Consumer Food Marketplace*

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Summary

The prevalence of overweight and obesity is increasing in most Western countries. While this trend imposes a serious threat to economic welfare it also has severe consequences for the health and quality of life of the individual consumer. However, an increasing complexity in the food marketplace suggests that many consumers may be unable to buy their food with confidence and also that they may find it difficult to justify their decisions by making evaluations and comparisons of the individual food health attributes. In such an environment healthy food choices are made harder for the consumer and several studies already suggest that consumers' stress level is on the increase. In this paper one qualitative (n=16) and one quantitative (n=89) pilot study initially indicated that post-purchase stress is a well-known phenomenon among food consumers. Based on a larger survey (n=504) including three different food product categories, three post-purchase stress consumer segments (low post-purchase stress level, medium post-purchase stress level and high post-purchase stress level) were identified. For the purpose of discriminating between segments a multiple discriminant analysis was carried out involving various potential discriminating constructs (i.e., food health information seeking, general food health involvement, product-specific food health involvement, usage of food information short-cuts, and food health competency). The results suggested that the included discriminating constructs were able to explain a substantial proportion of the variance in consumer segments. In the paper, a number of demographic variables were also included for the purpose of identifying consumer segment characteristics and several significant relations were revealed.

Introduction

The Western world is facing an obesity crisis. Facing such circumstances, it is not surprising that both authorities and consumers in most industrialized countries have become increasingly concerned about health issues related to their food intake (Smed and Jensen, 2005). Nevertheless, many consumers do not follow the official recommendations on diet and physical activity. For instance, in Scandinavia too many consumers have a much too low

intake of fruits & vegetables and fish and a too high intake of (especially) saturated fat (Nordic Plan of Action, 2006). This obesity crisis has lead to an increased focus on 'healthy' products in the food marketplace and everyday consumers are exposed to new information concerning what to eat and how to balance their food intake in terms of amount additives, nutritional value, energy content, and the like. These conditions have contributed to the fact that the environment in which the food consumer must plan and execute her/his behavior has become increasingly complex. The increasing complexity suggests that consumers may be unable to buy their food with confidence and also that they find it difficult to justify their decisions from making evaluations and comparisons of the individual food attributes. Several authors thus suggest that consumers' stress level is on the increase (e.g., Supermarket Business Magazine, 1997; Packaged Facts, 2007). Stress can be experienced during number of activities and situations. E.g., when under time pressure, when shopping in a supermarket (Aylott and Mitchell, 1998), and when one is uncertain about whether there is a gap between one's self-interest and one's actual behavior (Lazarus and Folkman, 1984). This paper sets out to investigate post-purchase health-related stress in the food marketplace. The purpose of the paper is three-fold. The first purpose is to investigate whether different consumer health related stress segments (e.g., low stress, high stress, etc.) can be meaningful detected in the food marketplace. The second purpose is to examine whether a number of food related psychographic factors derived from literature may be able to discriminate between consumer health-related stress segments. Finally, the third purpose is to explore the extent to which consumer demographic characteristics may vary across consumer health-related stress segments. In addition to these purposes, we investigate the stability of the results across three different food product categories.

Background and research questions

Following the stress definition offered by Thoits (1995), stress can broadly be understood as "any environmental, social or internal demand that require the individual to adjust his/her behavioral patterns" (p. 65). Such demands are disruptions of previously more or less balanced or homeostatic states (Lazarus and Folkman, 1984), which may lead the consumer to be in a dissonant and stressful state (Festinger, 1957). According to Festinger's early conceptualization a person can be described as being in a dissonant state if two elements in her/his cognition (e.g., her/his knowledge of her-/himself and her/his behavioral patterns,

her/his attitudes, feelings or desires) are in imbalance. Festinger suggests that dissonance can be "…an extremely painful and intolerable thing" (p. 266) and to avoid dissonance the consumer will therefore seek to balance her/his knowledge, attitudes, goals, feelings or desires in order to serve her/his self-interest. If consumers' rationality was unbounded and if they had unlimited amounts of time they would always know what choices to make to serve their interests - and since this can happen with full certainty no dissonance would occur. Growing evidence (Dolfsma, 2002; Bettman, Luce and Payne, 1998; Denzau and North, 1994) suggests, however, that in the dynamic and complex real world consumers rarely have a comprehensive idea of what behavior may serve their interests in the best way. Moreover, in this complex world consumers' may draw 'false' conclusions about health-related issues, which may lead them to carry out less healthy behavior. As an example, Chandon and Wansink (2007) found that people are more likely to underestimate the caloric content of main dishes and to choose higher-calorie side dishes, drinks, or desserts when fast-food restaurants claim to be healthy compared to when they do not. Ethical issues concerning production methods, pollution and distribution adds to the complexity of the environment in which the consumer has to conduct her/his food health behavior. Another important issue concerns the verifiability of health communication. When buying a food product consumers cannot actually experience the degree of healthiness (like they can experience the price, the brand, the colour, etc.). Healthiness is therefore a credence food dimension since even in the usage situation it cannot be perceived and evaluated by the consumer because of its long-term nature (Darby and Karni, 1973). Constantly exposing consumers to new health related information (i.e., external demand) may lead to post-purchase frustrations and uncertainties if consumers cannot easily adjust their behavioral patterns to the health-related demands when in the food store. Based on such considerations, we explore as follows.

> RQ1: (a) Is post-purchase health-related stress present in the consumer food marketplace? (b) Does the amount of health-related stress vary across consumer segments?

A number of factors may potentially influence whether the individual consumer will experience a stress situation. *Perceived choice complexity*. Perceived choice complexity can be conceptualized as the perceived difficulty 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 complexity may also add uncertainty to the choice situation and to post-purchase health considerations. *Amount of information seeking.* Consumer resources are scarce. If a consumer has engaged in information seeking (i.e., shown a high level of cognitive and/or affective activity during the process of learning about the product and its attributes), this may lead to an increased post-purchase stress since the consumer may fear a loss of mental resources if the expected degree of product healthiness can not be confirmed. On the other hand, information seeking may also lead the consumer to carry out a more confident choice, which may reduce post-purchase stress. *Level of health involvement*: Since high-involved consumers care more about their choices than low-involved consumers they (potentially) also face the highest risk of experiencing post-purchase stress (Kunda, 1990). However, just being high involved may not be a sufficient condition for having a higher post-purchase stress propensity since the high-involved consumer may already posses enough knowledge to carry out a balanced decision and therefore will not have to face the task of justifying that the transformation of health-related information into knowledge has occurred successfully. A distinction should be made between intrinsic involvement, which is stable and enduring, and situational involvement, which is transient (Okechuku, 1992). The former derives from enduring personal involvement (like general food health involvement) while the latter derives from transitory environmental cues (like involvement in the healthiness of a specific food product, which the consumer considers to purchase). *Perceived attractiveness of information short-cuts*. In many countries, food authorities have introduced (or may consider introducing) 'nutritional labels' that divide food products into e.g., healthy, less healthy and unhealthy products - thereby making it easier for consumers to choose healthy food products without having to evaluate product attributes. Naturally, such 'information short cuts' should be expected to be in highest demand by consumers who find a need for them. This need may arise because of a perceived lack of competency to evaluate nutritional and health information, because the consumer is simply health motivated and/or because the consumer is uncertain (and perhaps stressful) and thus is thankful for any extra information concerning healthiness. Also, food labels may reduce consumers' feelings of guilt (Wansink and Chandon, 2006) and may therefore be associated with less stress. *Product-specific health competency*. Evidence (Zinkhan and Braunsberger, 2004) suggests that a well-developed competence structure is likely to reduce perceived

complexity towards the decision in question. This may reduce the amount of post-purchase stress perceived. On the other hand, a high degree of product-specific health competency may have been facilitated by a high degree of health involvement, since high involved consumers are more likely to engage in active learning and are likely to develop stronger competencies toward the subject in question (Blackwell et al., 2006). We investigate as follows.

> RQ2: (a) To what extent will perceived choice complexity, amount of information seeking, level of health involvement (general and product-specific), usage of information short-cuts, and product-specific health competency influence food consumers experience of post-purchase health related stress? (b) To what extent do the results obtained from RQ2 (a) vary across food categories?

We also investigate whether a range of well-known food consumer characteristics (refer to e.g., Hansen and Solgaard, 2004) may distinguish between the amounts of health-related post-purchase stress experienced by consumer segments.

> RQ3: To what extent will gender, age, household size (i.e., number of children in household, household income per year), household monthly grocery budget, and educational level vary across different levels of post-purchase stress?

Methodology

Pilot studies

Two pilot studies were conducted for the purpose of (a) developing a measurement instrument suitable for this study; (b) initial verification of the developed measurements.

Pilot study I – identification of food-related post-purchase stress-considerations: Sixteen in-depth interviews were conducted with an equal participation of women and men. Eight interviewees were randomly selected among undergraduate business students at Copenhagen Business School in Denmark and the remaining eight interviewees were selected among 'ordinary' consumers with a focus on getting a variation among the participants in relation to gender and educational background. The interviews were semi-

structured around a few guiding themes, including food, post-purchase mental justifications, health and shopping behavior. The interviews were audio-recorded and lasted on average 1-1½ hour. The results revealed post-purchase stress to be a well known phenomenon among the interviewees. Responses could be structured around three main themes: (1) Mental imbalance following from a perceived insufficient knowledge of food and healthiness. (2) Frustrations related to insufficient amounts of information available in the marketplace. (3) Uncertainty about the health consequences of eating various food items.

Multiple item 7-point Likert scales (1=disagree totally; 7=agree totally) were then developed for all the theoretical constructs used in this study. The items used to measure the constructs in the survey are shown in the appendix. In addition to the input obtained from the pilot study we also draw on previous research. In measuring general & product-specific health involvement and product specific health competency we draw on numerous writers, including Beatty and Talpade (1994). To measure product specific information-seeking we draw on dimensions identified by Moorthy, Ratchford and Talukdar (1997) among others. In measuring 'post-purchase stress' items were derived from the Cohen, Kamarck and Memmelstein (1983) Perceived Stress Scale.

Pilot study II – initial verification of measurement scales: 220 undergraduate and graduate students and 90 members of a consumer research community, all associated with a large Danish Business School, were contacted for the purpose of pre-testing the applied constructs (and for the purpose of obtaining preliminary results concerning the proposed framework). 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 accomplished. First, 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. Second, 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. Third, an exploratory factor analysis was conducted for each of the constructs using an eigenvalue of 1.0 as the cut-off point. The result of this procedure showed three items, which were candidates for removal from the measurement scales. When these items were 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 (refer to below) did result in the removal of one additional item. The deleted survey-item is marked in the appendix.

Data collection

Data were collected in a nationally representative consumer-panel among 504 Danish consumers using a questionnaire. The data collection was carried out by the market research agency ACNielsen. The following three food types were investigated: salad dressing, biscuits, and ready dinner meals. The following criteria guided the selection of the food products. First, the selected food products should not require any complex cooking procedures to facilitate respondents' assessment of post-purchase health-related dissonance. Second, the food products should have the potential of creating sufficient variations in consumers' assessments of perceived health complexity, information seeking among other things. The pre-test (refer to above) suggested that salad dressing, biscuits and ready dinner meals all had such a potential and therefore these products were used in the study.

Each respondent was exposed to each of the three product categories, leaving us with a potential of 1512 cases to be analyzed. All respondents were screened to make sure that they regularly carry out food shopping. Of the respondents, 50.6% were women, the average household size was 2.34, and the average age was 44.61 years and ranged between 18-77 years with a fairly normal spread.

In order to minimize the occurrence of missing cases it was decided to split the product sample into three identical questionnaires. For each product category the respondent was asked various questions concerning post-purchase stress and other questions related to the constructs included in the study. Additionally, there were a number of questions concerning household and respondent demographics. For each of the three product categories, only answers from respondents who indicated that they buy each of the three investigated product categories regularly were included. The application of this procedure leaves us with a total of 726 cases, distributed across product categories in a satisfactory way (all product categories were represented by 166 to 281 cases).

Results

Confirmatory factor analysis - CFA

CFA based on AMOS 7.0 was used to investigate construct reliability and verify measurement reliability for usage of information short-cuts, product-specific food health involvement, general food health involvement, product-specific food health information seeking, product-specific food health competency, and post-purchase stress (Table 1). The root mean square error of approximation (RMSEA=0.05) and the comparative fit index (CFI=0.94) show a good degree of fit of the measurement model. The conducted chi-square test (χ^2=932.63, d.f.=215; p-value<0.01) rejects a perfect absolute fit between the data and the measurement model. However, the Hoelter(0.05) estimate (=406) suggests that the lack of absolute fit can be explained by sample size. The expected relationships between constructs and their indicators are supported with all items significantly related to their constructs. The construct reliability was assessed using Cronbach's (1951) alpha, α and Jöreskog's (1971) rho coefficient, ρ. The α reliabilities all exceeded 0.70 and the values of Joreskog's ρ, which does not rely on sample size and which is less sensitive to the number of items analysed (Valette-Florence, 1998), were also larger than 0.70 for all constructs. These results indicate a good reliability of each of the measured constructs.

Convergent validity of the individual constructs in the model is sufficiently confirmed because the means of the squared factor loadings are close to or greater than 0.5, except one, which however is above 0.40.

Table 1. Confirmatory Factor Analysis Results

Construct/indicator	Standardized factor loading[a]	Critical ratio	Reliability α / ρ	Convergent validity
Usage of information shot-cuts			0.73 / 0.76	0.62
X1	0.92	-		
X2	0.62	13.25		
Product-specific food health involvement			0.85 / 0.86	0.60
X3	0.87	-		
X4	0.73	23.12		
X5	0.75	24.14		
X6	0.75	24.08		
General health food involvement			0.85 / 0.87	0.63
X7	0.83	-		
X8	0.92	42.87		
X9	0.50	19.98		
X10	0.86	40.13		
Product-specific food health information seeking			0.90 / 0.90	0.69
X11	0.67	-		
X12	0.85	20.92		
X13	0.88	21.66		
X14	0.91	22.07		
Product-specific food health competency			0.82 / 0.84	0.43
X15	0.82	-		
X16	0.54	11.61		
X17	0.76	21.83		
X18	0.79	22.76		
X19	0.62	17.10		
Post-purchase stress			0.78 / 0.81	0.52
X20	0.52	-		
X21	0.82	10.56		
X22	0.74	10.30		
X23	0.77	10.42		

Notes: [a] One item for each construct was set to 1. χ^2=932.63, d.f.=215, p<0.01; Hoelter (0.05)=406; CFI=0.94; RMSEA=0.047.

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 eleven of the investigated fifteen 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 usage of information short-cuts, between post-purchase stress and usage of information short-cuts and product-specific health information seeking, respectively, and between product-specific health information seeking and usage of information short-cuts. In order to further investigate discriminant validity the method proposed by Fornell and Larcker (1981) was applied for the four relations. The extracted variance for each of the individual construct was for all four relations greater than the squared correlation between constructs suggesting that sufficient discriminant validity is obtained.

RQ 1(a and b): Cluster analysis

Cluster analysis (using SPSS 15.0) was employed for the purpose of exploring whether a viable typology of consumers' post-purchase stress-related considerations can be detected. A two-step process was utilized. First, hierarchical clustering was used to identify the numbers of clusters implied by the data. Then, *k*-means clustering was used to fine-tune the results from the hierarchical procedure (Hair, Tatham and Black, 1998). The between-groups linkage method of clustering using the squared Euclidean distance was applied in the initial hierarchical approach to develop the number of clusters. A review of the percentage change on the agglomeration coefficient suggested a three-cluster solution. In the second-stage non-hierarchical analysis, which employed a *k*-means approach, three clusters were therefore specified. Mean values and the ANOVA results are displayed in Table 2.

For the purpose of assessing the stability of the cluster analysis result across the three product categories (salad dressing, biscuits and ready dinner meals), three separate cluster analyses were conducted. The results of the cluster analyses suggested for each of the three product categories that a three-cluster solution was appropriate. Also, the obtained cluster-segments were for all three product categories very similar to the cluster solution reached when the three product categories were pooled together. Thus, we conclude that the cluster solution based on a pool of the three product categories is stable across product categories.

Table 2. Cluster analysis results

	Cluster MS	df	EMS	F Value	Sign.	Final Cluster Centers (means) [a] Cluster I (n=273)	Cluster II (n=270)	Cluster III (n=183)
Consumer post-purchase stress								
X1 After eating [the product in question], I'm often uncertain about it's health consequences	300.08	2	3.58	83.90	<0.001	2.95	3.59	5.26
X2 When returning to my home with [the product in question] I occasionally speculate whether it is good for my health	1138.68	2	1.52	751.07	<0.001	1.52	3.77	6.04
X3 When consuming [the product in question] I am occasionally unpleased with my-self	1039.52	2	1.55	670.16	<0.001	1.49	3.55	5.83
X4 When I have purchased [the product in question] I find it occasionally frustrating how difficult it is to pick a healthy one	977.36	2	1.79	544.82	<0.001	1.71	4.13	5.83

[a]All differences between cluster means are significant at the 0.01-level.

Cluster I (273 cases) contains cases in which consumers experience low post-purchase stress. The cluster centers are for all the included items below the midpoint of the applied 7-point scale. Cases in which consumers are experiencing a medium level of post-purchase stress, all items are around the midpoint of the 7-point scale, develops *cluster II* (270 cases). *Cluster III* (n=183) contains cases in which consumers are experiencing high post-purchase stress. The cluster centers are for all the included items above the midpoint of the applied 7-point scale. With 453 consumer cases out of a total of 726 cases (corresponding to approx. 62%) associated with either medium or high post-purchase stress, post-purchase stress is present in the food marketplace. All differences between cluster means were significant at the 0.01 level. We therefore also conclude that consumer post-purchase cases can meaningful be divided into segments according to the level of post-purchase stress.

RQ2(a): Discriminant analysis

In each of the three detected segments (clusters), all items show univariate differences between the considered segment and each of the other two segments (refer to Table 3). This suggests that multiple discriminant analysis will be appropriate for the purpose of

investigating RQ2. Thus, multiple discriminant analysis (using SPSS 15.0) was used to explore the degree to which respondents' perceptions of healthy food choices in the marketplace can predict segment membership. To test the assumption of equal variance-covariance Box's M test statistic was applied. The following values were obtained: Box's M= 98.40; approximately F=3.24; df=30; *p*-value<0.001 indicating a violation of the equal variance-covariance assumption. However, this test is sensitive to other factors (e.g., sample size) other than just covariance differences (Hair et al., 1998). Therefore, the *log determinants* of the group covariance matrices were also inspected. The group log determinants were similar indicating that no substantial problem of violation of the equal variance-covariance exists. Note also, that the corresponding F value was only 3.24, suggesting that the departure from the null was not large (refer to Noble and Schewe, 2003). The internal validity of the generated discriminant functions was assessed using the leave-one-out (the U-method) cross-validation method.

Only the first discriminant function (Wilks' λ=0.670; χ^2=253.88; df=10, *p*-value<0.001) was significant and explains 32.9% of the variance in the three segments. Since the second function is not significant, its associated statistics will not be used in the interpretation of the ability of the five constructs to discriminate among segments. The first discriminant function, which accounts for 99.7% of the variance explained by the two functions, correctly classified 55.9% (54.8%, cross validation) of original grouped respondents (Table 3).

For the purpose of assessing the overall fit of these classification results, the hit ratios were compared against the proportional chance criterion (C_{pro}=29.6%) and the maximum chance criterion (C_{max}=37.6%) (Hair et al., 1998). The proportional chance criterion determines if the obtained classification is better than chance, while C_{max} determines if these results exceed the percent of respondents that would be correctly classified if all observations were assigned to the segment with the greatest probability of occurrence. Hit ratios for both samples substantially exceed these estimates.

Table 3. Classification results

		Predicted group		
Actual group	*Number of cases*	*Segment 1*	*Segment 2*	*Segment 3*
Analysis sample[a]				
Segment 1	*273*	***160***	*101*	*12*
		(58.6%)	*(37.0%)*	*(4.4%)*
Segment 2	*270*	*79*	***152***	*39*
		(29.3%)	*(56.3%)*	*(14.4%)*
Segment 3	*183*	*16*	*73*	***94***
		(8.7%)	*(39.9%)*	*(51.4%)*
Leave-one-out validation[b]				
Segment 1	*273*	***158***	*103*	*12*
		(57.9%)	*(37.7%)*	*(4.4%)*
Segment 2	*270*	*82*	***148***	*40*
		(30.4%)	*(54.8%)*	*(14.8%)*
Segment 3	*183*	*17*	*74*	***92***
		(9.3%)	*(40.4%)*	*(50.3%)*

[a] *Percent of original grouped cases correctly classified: 55.9% [(160+152+94)/726=55.9%]*
[b] *Percent of cross-validated grouped cases correctly classified: 54.8% [(158+148+92)/726=54.8%]*

However, since we have unequal group sizes, it is important that the C_{max} criterion is complemented with other overall fit measures. The computed Press's Q statistic (Press, 1972) gave the following results: $Q_{original}$ =405.83; $Q_{cross\text{-}validation}$=397.85, which in both cases exceed the critical value of χ^2=6.63, df=1, with a significance level of 0.01. We therefore conclude that the classification of respondents in both samples is significantly better than chance.

The standardized coefficients and discriminant loadings for each construct along with the group centroids are provided in Table 4.

The standardized coefficients denote the partial contribution of each of the constructs to the discriminant function. The larger the standardized coefficient the greater is the contribution of the respective construct to the discrimination between segments. However, several authors (e.g., Hair et al., 1998) warn that the interpretation of the standardized coefficient may lead to misinterpretations. As in regression analysis, a small weight may either indicate that the discriminating power of a construct is low or that it has been partialed out of the relationship because of high degree of multicollinearity (Hair et al., 1998). In the present study, several significant bivariate correlations (indicating multicollinearity) were detected among the independent constructs. We therefore evaluate the discriminating power of each construct on the basis of discriminant loadings, which are considered relatively more

valid than standardized coefficients as a means of interpreting the discriminating power of the independent constructs because of their correlational nature (refer to Hair et al., 1998). The discriminant loadings denote the correlations between the constructs and the discriminant function.

As it can be seen from Table 4, all constructs had substantial loadings (>±0.30, Hair et al., 1998). Usage of information short-cuts (discriminant loading=0.642) and product-specific health competency (discriminant loading=0.604) were the main contributing constructs in discriminating between segments. A high loading was also obtained for product-specific health involvement (discriminant loading=0.567), whereas also substantial, but minor, loadings were obtained for general health involvement (discriminant loading=0.458) and product health information seeking (discriminant loading=0.386).

Table 4. Summary of multiple discriminant results

	All products Function 1		*Salad dressing* Function 1		*Biscuits* Function 1		*Ready dinner meals* Function 1	
Construct	*Discriminant loading*	*Standardized coefficient*	*Discriminant loading*	*Standardized coefficient*	*Discriminant loading*	*Standardized coefficient*	*Discriminant loading*	*Standardized coefficient*
Usage of information short-cuts	*0.642*	*0.254*	*0.599*	*0.214*	*0.702*	*0.337*	*0.494*	*0.026*
Product-specific health involvement	*0.567*	*0.381*	*0.533*	*0.493*	*0.663*	*0.222*	*0.332*	*0.405*
General health involvement	*0.458*	*0.231*	*0.392*	*0.094*	*0.546*	*0.255*	*0.352*	*0.352*
Product-specific health information seeking	*0.386*	*0.199*	*0.344*	*0.146*	*0.516*	*0.330*	*0.185*	*0.133*
Product-specific health competency	*0.604*	*0.725*	*0.653*	*0.802*	*0.543*	*0.567*	*0.708*	*0.995*
X^2	*253.8 (df=10, p<0.001)*		*94.05 (df=10, p<0.001)*		*78.86 (df=10, p<0.001)*		*90.57 (df=10, p<0.001)*	
Variance explained	*0.329*		*0.315*		*0.302*		*0.472*	
Canonical correlation	*0.574*		*0.561*		*0.550*		*0.687*	
	Group centroids		*Group centroids*		*Group centroids*		*Group centroids*	
Segment 1	*-0.788*		*-0.717*		*-0.688*		*-0.963*	
Segment 2	*0.050*		*0.231*		*0.142*		*-0.217*	
Segment 3	*1.014*		*1.218*		*0.876*		*1.547*	
	*Mahalanobis Distance**		*Mahalanobis Distance**		*Mahalanobis Distance**		*Mahalanobis Distance**	
Segment 2-1	*-0.93[a]*		*-0.86[a]*		*-1.09[a]*		*-0.75[a]*	
Segment 3-1	*0.06[a]*		*0.16[a]*		*0.01[a]*		*-0.01[a]*	
Segment 3-2	*1.27 [a]*		*1.15 [a]*		*1.03 [a]*		*1.88 [a]*	
Descriptive statistics	*Mean*							
	Segment 1	*Segment 2*	*Segment 3*					
Usage of information short-cuts	*3.65*	*4.63*	*5.58*					
Product-specific health involvement	*3.74*	*4.47*	*5.32*					
General health involvement	*4.61*	*5.11*	*5.71*					
Product-specific health information seeking	*4.11*	*4.70*	*5.27*					
Product-specific health competency	*3.65*	*4.50*	*5.58*					

** Mahalanobis distance was calculated using the discriminant scores generated by the first discriminant function; positive/negative signs were maintained during the calculation.*

[a] Mahalanobis distance significant at the 0.01 level.

F-tests of the equality of group means supported these results. All p-values were <0.001 indicating that, for each of the five constructs, means are unequal across the three consumer segments.

An examination of group centroids suggests that function 1 discriminates between segment 2-1, segment 3-1 and segment 3-2 consumers. Calculating the Mahalanobis distance measure between segments and computing the associated F-value tested the statistical differences between group centroids. All differences between segments were significant at the 0.01-level (Table 4).

When compared to segments 1 and 2 (cases in which consumers are experiencing low and medium post-purchase stress, respectively), segment 3 (cases in which consumers are experiencing high post purchase stress) consumers are more inclined to use health information short-cuts, feel a higher degree of product health competencies, show more product-specific and general health involvement, and seek more product health information. In turn, when compared to segment 1 (cases in which consumers are experiencing low post-purchase stress) segment 2 (cases in which consumers are experiencing medium post-purchase stress) consumers are more inclined to use health information short-cuts, feel a higher degree of product health competencies, show more product-specific and general health involvement, and seek more product health information. The descriptive statistics (means of constructs across segments) provided in Table 4 clearly support these results.

RQ2(b) Moderating effects of product type

To examine whether product type would moderate the obtained results from the discriminant analysis, three additional discriminant analyses (one for each product) were carried out. The analyses validate that the results based on the pooled sample are nearly identical across product type. For each of the five constructs, means were unequal across the three consumer segments for all product types. Also, the discrimination among segments followed similar patterns suggesting that function 1 (for all products, only function 1 was significant) discriminates between segment 2-1, segment 3-1 and segment 3-2 cases. Mahalanobis distance measures suggested that the interpretation of the discrimination among segments is similar to the interpretation that could be related to the pooled sample (refer to above). Some minor moderating effects of product type were, however, obtained. While usage of information short-cuts for the pooled sample and for biscuits was the main discriminating

construct, product-specific health competency took this position for both salad dressing and ready dinner meals. Also, while product-specific health information seeking had a substantial loading for the pooled sample, salad dressing and biscuits, the loading for this construct was non-substantial for ready dinner meals.

RQ3 Respondent characteristics across segments

For the purpose of evaluating the extent to which the demographic characteristics of the respondents explain segment classification seven demographic variables were measured in the survey: gender, age, household size (total number of persons in household, number of children (aged less than 20) in household), household income per year, household monthly grocery budget, and educational level of respondent. Several demographic differences across segments could be detected (Table 5).

Table 5. Respondent characteristics across segments

Demographic variable	*Segment 1 (n=273)*	*Segment 2 (n=270)*	*Segment 3 (n=183)*
Gender**			
Male	*54.9%*	*51.1%*	*39.3%*
Female	*45.1%*	*48.9%*	*60.7%*
Age**			
Average age	*43.77*	*44.14*	*48.50*
Household size			
Average number of persons in household	*2.35*	*2.40*	*2.44*
Average number of children in household	*1.72*	*1.82*	*1.84*
Household income per year*			
Average DKK[a]	*5.34*	*5.06*	*4.72*
Monthly grocery budget			
Average DKK[b]	*6.63*	*6.00*	*6.90*
Educational level**			
Basic school (7 years)	*0.4%*	*0.7%*	*4.9%*
Basic school (9 years)	*12.1%*	*9.3%*	*14.2%*
Basic school with diploma (10 years)	*34.1%*	*37.4%*	*38.8%*
High school (12-13 years)	*53.5%*	*52.6%*	*42.2%*

**: Group differences significant at the 0.01 level *: Group differences significant at the 0.05 level.
All respondent characteristics were indifferent across segments.
[a]: Average on 10-point scale ranging from 'less than dkk 100000' to 'more than dkk 900000'.
Scale mid-point is 400000-499000.
[b]: Average on a 19-point scale ranging from 'less than dkk 1000' to more than dkk 9500'.
Scale mid-point is '5001-5500'.

While segment 3 (high post-purchase stress) contains more female than male cases, less female than male cases are found in segment 1 (low post-purchase stress). The results also revealed that the average age is significantly higher for segment 3 cases than for segments 1 and 2 cases and that post-purchase stress cases decrease with an increase in household income and educational level. No differences across segments were detected for household size and monthly grocery budget.

We also investigated whether the results concerning respondent characteristics across segment vary with product type. These investigations produced similar respondent differences across segments 1, 2 and 3 suggesting that the results are stable across product type.

Discussion

The overall purpose of this research was to investigate the extent to which consumers experience post-purchase stress in the food marketplace and whether such stress can be explained by a number of psycho-graphic constructs. Cluster analysis identified three groups of consumer post-purchase stress segments. Segment 1 included cases associated with low post-purchase stress; segment 2 included cases associated with medium post-purchase stress; and segment 3 included cases associated with high post-purchase stress. With 453 consumer cases (segment 2=270; segment 3=183) out of a total of 726 cases (corresponding to approx. 62%) associated with either medium or high post-purchase stress, we conclude that post-purchase stress is present in the food marketplace and also that consumer food cases can be segmented by the level of post-purchase stress (refer to RQs 1a and 1b).

Our premises for conducting this study were that we anticipated that consumers who are constantly exposed to new information concerning food health issues may feel stressed if they can not easily adjust their behavioral patterns to the health related demands when in the food store. While the results of this study confirmed the existence of post-purchase stress among food consumers this does not mean, of course, that post-purchase stress can be attributed solely to our research premises. Thus, we also investigated whether a number of psychographic factors (usage of health information short-cuts, product-specific health involvement, general health involvement, product-specific health information seeking and product-specific health competency) would influence the level of post-purchase stress. The overall results of an inter-segment comparison showed that segment 3 consumers score

higher on all the psychographic factors than do segments 1 and 2 consumers and also that segment 2 consumers have higher scores than segment 1 consumers. In the survey, all five psychographic factors were found to discriminate segment 3 from 2 and 1 and segment 2 from 1. These results give support to the notion that consumers do not necessarily try to create justifications for all decisions; rather they seek to justify decisions they are motivated to make (Kunda, 1990). From this perspective consumers experiencing high post-purchase stress are more likely to do so because they are involved in food health and are thus more likely to care about the healthiness of the purchased food. Positive correlations were present between general food health involvement and the other constructs included in this study (except for a low and insignificant correlation between general food health involvement and product-specific food health competency). This is in line with previous research suggesting that high involved consumers are more likely to engage in active information seeking and learning and are likely to develop stronger competencies toward the subject in question (Blackwell et al., 2006; Zinkhan and Braunsberger, 2004).

Women were found to be more likely than men to experience post-purchase stress in the food marketplace. One explanation for this may be that women – compared to men - 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). In our study, respondents with high scores on such characteristics were more likely to experience post-purchase stress. Moreover, 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 – caring more about the healthiness of the family and therefore perhaps more likely to experience post-purchase food health-related stress (Babin and Boles, 1998; Eagly, Karau and Makhijani, 1995). Also, research (Hansen and Solgaard, 2004) suggests that women are still responsible for the larger part of the household food shopping. This was confirmed in our study. In the study, 72% of female respondents agreed that they are ‘the main responsible for carrying out the food shopping’, whereas only 41% of male respondents agreed to the same statement. In addition to the gender differences segment 3 cases were also represented by respondents with the highest age. This supports previous research which has found that food health interested consumers are older than average (Rimal, Fletcher and McWatters, 2000; ATV, 2007). However, these studies have also found health-interested consumers to have a higher educational level than

average. In the present study, segment 3 cases were represented by respondents with an educational level (with an associated income) below average. This *might* suggest that lower-educated consumers, all other things being equal, are more sensitive to post-purchase stress factors than other consumers. However, future research may wish to further explore this issue.

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Appendix

Items used to measure the constructs applied in the study

General food health involvement. X1: In general, I'm very interested in healthy food products. X2: Living a healthy life is very important to me. X3: I'm usually bored when I listen to discussions about food and healthiness*. X4: Food and healthiness is highly relevant to me.

Product-specific health involvement. X5: Choosing a healthy [the product in question] is important to me. X6: I will do a lot to prevent buying an unhealthy [the product in question]. X7: I don't usually spend time to explore the health consequences of [the product in question]*. X8: Only rarely I try to find the healthiest [the product in question]*.

Product-specific health information seeking. X9: Before choosing a [the product in question] I often compare several variants. X10: I normally scan the package to find information about it's [the product in question] healthiness. X11: When choosing among [the product in question] I normally use the information concerning healthiness found on the package. X12: I use the information found on the package when buying a [the product in question].

Product-specific health competencies. X13: It is difficult for me to evaluate information concerning the content of different types of [the product in question]*. X14: I don't think that I'm capable of finding the healthiest [the product in question]*. X15: I'm not sure what to look at when assessing the healthiness of various types of [the product in question]*. X16: It is very complex for me to choose between various types of [the product in question] based on the degree of healthiness*. X17: I often choose the [the product in question] that looks the best as I cannot choose [the product in question] based on health characteristics*. X_{del}: During shopping it is often difficult for me to spot healthy food products*[a].

Usage of information short-cuts. X18: I'd wish [the product in question] was labelled with a health claim in order to be able to choose the healthiest one on that basis. X14: Health Claims (such as 'healthy' or 'nutritional') on the wrapping would be a great help in order to buy a healthy [the product in question].

Post-purchase stress. X20: After eating [the product in question], I'm often uncertain about its health consequences. X21: When returning to my home with [the product in question] I occasionally speculate whether it is good for my health. X22: When consuming [the product in question] I am occasionally unpleased with my-self. X23: When I have purchased [the product in question] I find it occasionally frustrating how difficult it is to pick a healthy one.

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*: Item inverted
[a]: Item deleted

Bibliography

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