

Generic Advertising for Fish: Results from a Research-based Campaign

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Abstract. Before and after the 3-year generic advertising campaign for fresh fish in Denmark, representative consumer samples were surveyed with regard to their attitudes towards fresh fish, perceived family norms, availability of fresh fish in shops, meal preparation skills, intentions to buy fresh fish, and actual consumption frequencies. In the pre-campaign survey (effective $N = 641$), significant determinants of consumption frequency were availability in shops, meal preparation skills, and intentions to buy fresh fish. Consistent with the intended effects of the campaign, availability in shops and meal preparation skills lost their influence in the post-campaign survey (effective $N = 523$). Instead, family norms were the only direct as well as indirect (mediated by intention to buy) influences on consumption frequency. Mean levels of intention to buy and consumption frequency were significantly higher after the campaign.

Keywords: Consumer attitudes, generic promotion, fresh fish, advertising effects, structural equation modeling

1 INTRODUCTION

In the period mid 1996 to end 1999, a generic advertising campaign for fish was carried out in Denmark. The aim of the campaign was to increase the overall sales of fish to consumers both in terms of volume and value by 25% before the year 2000. The campaign was conceived and coordinated by a consortium of major actors in the Danish fish sector, and it was financed 50% by European Union funds and 50% by the Danish state.

The campaign was based on a study of determinants of Danish consumers' purchase of fish products, which was carried out in 1994-1995 (Grunert, Bisp, Bredahl, Sørensen & Nielsen, 1995). In that study, a multi-method approach was used to shed light on consumer behavior with regard to fish: focus groups were conducted to obtain preliminary insights, laddering interviews were conducted to obtain qualitative insight into consumers' positive and negative associations to choosing fish as a major meal ingredient, and a survey was aimed at estimating a quantitative model explaining differences in consumption of three major product categories (Bredahl & Grunert, 1997).

The conclusions emerging from this series of studies were that by far most consumers had a positive attitude with regard to eating fish, which they saw as healthy and mostly also tasty food. However, the positive attitude often failed to result in purchase intentions and/or actual purchases because a number of barriers were perceived: fish was regarded as difficult to get hold of, difficult to

prepare, and difficult to eat. The difficulty in getting hold of fish was related to the fact that, as of 1994-1995, fresh fish was unavailable in Danish supermarkets and had to be bought at fishmongers. Difficulties in preparation were related to a lack of knowledge of preparation methods, recipes, difficulties in judging quality, and impressions of lengthy preparation times. Difficulties in eating were related to messy bones.

Based on this input, a campaign was designed and launched. The backbone of the campaign was a series of TV spots featuring a middle-aged couple, *Minna* and *Gunnar*, and starring two well-known Danish comedians. The major emphasis was on that tasty fish dishes could be prepared in a quick and convenient way. The TV spots were complemented by in-store promotional material. The TV spots won several prizes and tracking studies showed consumer awareness of above 90%.

Companies in the fish sector were encouraged to supplement with their own activities, although the response to this was very mixed. The one major move which probably had a major impact on the campaign results was the introduction of fresh fish filets in MAP packaging in supermarkets during the beginning of the campaign, making it possible for Danish consumers to purchase fresh fish without having to go to a fishmonger.

Assessing the effects of the campaign (and of campaigns of this type in general) is complicated by the fact that reliable data on fish consumption at the household level is usually not available. *Danmarks Statistik* (the national

statistics agency) collects data on fish consumption only at large intervals and only in terms of money spent, not in terms of volume. Other volume data is unreliable and shows erratic movements, which makes them less valuable for evaluation purposes. Surveys of major suppliers of fish products in Denmark led an evaluator of the campaign to conclude that by the end of 1998 consumption had risen by 10% (PLS Consult, 1999).

However, assessments of change in absolute demand are obviously only a very coarse indicator of how the campaign has affected Danish consumers. Due to the fact that the campaign was designed based on empirical evidence about the factors affecting Danish consumers' purchase of fish, we have the possibility to conduct a much more fine-grained evaluation of the campaign. In addition to looking at changes in the level of consumption, we can look at changes in the level of determinants, and – most importantly – in the structure of the determinants. This is what we will do in the present paper. Based on two cross-sectional surveys before and after the campaign, and using multi-sample structural equation modeling as a statistical tool, we will be able to analyze changes in the structure of determinants of fish consumption before and after the campaign. The results will shed light not only on the effects of this particular campaign, but have interesting implications for possible effects of generic food campaigns in general and for methodology in evaluating such campaigns.

The theoretical approach employed is Ajzen's Theory of Planned Behavior (Ajzen, 1985; Ajzen & Madden, 1986). According to this theory, behavior and the intention to perform it can be explained by three factors: (a) the attitude towards performing the behavior, which in turn is related to the extent to which the behavior is expected to result in valued outcomes, (b) subjective norm, that is, the extent to which the behavior is expected to be valued by relevant others, and (c) perceived behavioral control, that is, the extent to which one believes the behavior and its outcomes to be under volitional control. In earlier applications of the Theory of Planned Behavior to food choice, all three components have been shown to have a potential effect on the intention to buy a particular food item (Schifter & Ajzen, 1985; Sparks, 1994; Raats, Shepherd & Sparks, 1995).

Our application of the Theory of Planned Behavior deviates in two ways from earlier applications. Firstly, the standard application involves the use of 'global measures' for the three main determinants of intention, which in turn are related to three types of beliefs – outcome beliefs for attitude, normative beliefs for subjective norm, and control beliefs for perceived control.

For each belief, two components are measured (strength and evaluation for outcome beliefs, strength and motivation to comply for normative beliefs, power and control access for control beliefs), which are multiplicatively combined before relating them to the global measure. However, this standard application involves some problems. Most notably, multiplying the two belief measures presupposes ratio-scaled measures; otherwise the results are dependent on the scale used (Dohmen, Doll & Orth, 1986; Evans, 1991; Wochnowski, 1995).

We therefore choose to interpret attitude, subjective norm and perceived control as latent constructs, which we relate to manifest measurements of belief strengths. Secondly, the standard version of the theory assumes that only perceived control affects behavior directly, whereas the effects of attitude and subjective norm on behavior are all mediated by behavioral intention. Since this assumption has been subject of some debate in the literature (Taylor & Todd, 1995), however, we open up for the possibility that all three constructs can have both direct and indirect (mediated by intention) effects on behavior.

2 METHOD

2.1 Data Collection

In early 1995, a random sample of 800 Danish households was drawn, with a quota imposed on region. Face-to-face interviews were then conducted with the person mainly responsible for food shopping and cooking in the household. Complete data sets were obtained from $N = 641$ participants. The mean age of the respondents was 45.33 years ($SD = 16.35$), 74.4% were female. A second, independent random sample of effectively $N = 523$ Danish households was drawn in 1999. Again, a quota was imposed on region, and face-to-face interviews were conducted with the person mainly responsible for food shopping and cooking in the household. The mean age of the respondents was 48.38 years ($SD = 16.35$), and 72.8% were female.

2.2 Measures

Consumers' attitudes towards fresh fish were measured by four items: (ATT-1) "When I eat dishes made from fresh fish, I will stay in good health", (ATT-2) "When I eat dishes made from fresh fish, I get a good feeling in my stomach", (ATT-3) "When I prepare dishes made from fresh fish, I get a varied diet", and (ATT-4) "When I

prepare dishes made from fresh fish, I want them to taste good”. All items were answered on seven-point scales ranging from “very unlikely” (1) to “very likely” (7).

Table 1: Means and standard deviations of observed variables in pre- and post-campaign samples.

Item	Pre-campaign sample (1995)		Post-campaign sample (1999)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
ATT-1	6.120	1.339	5.789	1.541
ATT-2	5.797	1.528	5.256	1.852
ATT-3	6.332	1.103	6.292	1.341
ATT-4	6.379	1.254	6.097	1.536
FNO-1	4.588	2.394	4.004	2.479
FNO-2	4.864	2.246	4.501	2.353
AVA-1	5.172	2.130	5.275	2.156
SKI-1	4.892	2.370	4.954	2.437
SKI-2	5.769	1.704	5.441	1.966
SKI-3	5.334	1.932	4.923	2.134
SKI-4	4.810	2.138	4.493	2.308
IBF-1	4.660	2.372	4.973	2.430
IBF-2	4.618	2.402	4.887	2.628
IBF-3	4.672	2.386	4.900	2.465
CFR-1	2.513	0.957	2.809	1.078
	<i>N</i> = 641		<i>N</i> = 523	

Perceived family norms were measured by two items: (FNO-1) “My family expects me to buy fresh fish” and (FNO-2) “I buy fresh fish out of consideration for my family”. Both items were answered on seven-point scales ranging from “completely disagree” (1) to “completely agree” (7).

Consumers’ perceptions of the availability of fresh fish in shops were measured by a single item: (AVA-1) “Fresh fish is easily available to me”, to be answered on a seven-point scale ranging from “completely disagree” (1) to “completely agree” (7).

Consumers’ meal preparation skills were measured by four items: (SKI-1) “It is difficult for me to clean and prepare fresh fish.”, (SKI-2) “I can easily prepare tasty dishes from fresh fish”, (SKI-3) “I can prepare many different dishes from fresh fish”, and (SKI-4) “It is difficult for me to judge the quality of fresh fish”. All items were answered on seven-point scales ranging from “completely disagree” (1) to “completely agree” (7).

All attitude, norm, availability and skill items had been constructed on the basis of the salient beliefs identified in the pilot studies (Grunert et al., 1995; Bredahl & Grunert, 1997).

Behavioral intentions were measured by three items: (IBF-1) “It is likely that I will buy fresh fish within the next two weeks”, (IBF-2) “I expect to buy fresh fish within the next two weeks”, and (IBF-3) “I intend to buy fresh fish within the next two weeks”. Again, all items were answered on seven-point scales ranging from “completely disagree” (1) to “completely agree” (7).

Consumption frequency was measured by a single self-report item: (CFR-1) “How often do you eat fresh fish?”, to be answered on a five-point scale with scale points “every day” (5), “once a week or more” (4), “several times a month” (3), “once a month or less” (2), and “almost never or never” (1). Means and standard deviations for all items are presented in Table 1.

2.3 Analysis

In its most general formulation (Jöreskog, 1971; Sörbom, 1974), a multi-sample structural equation model is defined by three simultaneous equations. The first one specifies the measurement model of the endogenous variables, representing the observed responses to P items ($p = 1, 2, \dots, P$) as a linear function of M latent factors ($m = 1, \dots, M$, $M \leq P$) and P random errors.

$$\mathbf{y}^{(g)} = \boldsymbol{\tau}_y^{(g)} + \Lambda_y^{(g)} \boldsymbol{\eta}^{(g)} + \boldsymbol{\varepsilon}^{(g)}, \quad (1)$$

where $\mathbf{y}^{(g)}$ is the $P \times 1$ vector of observed endogenous variables in group g , $\boldsymbol{\tau}_y^{(g)}$ is the $P \times 1$ vector of intercept terms, $\boldsymbol{\eta}^{(g)}$ is the $M \times 1$ vector of latent endogenous factors, $\Lambda_y^{(g)}$ is the $P \times M$ matrix of factor loadings, and $\boldsymbol{\varepsilon}^{(g)}$ is the $P \times 1$ vector of random errors, assumed to be uncorrelated with the latent factors and to have zero expectation. The second equation defines another factor-analytical measurement model, this time for the exogenous variables:

$$\mathbf{x}^{(g)} = \boldsymbol{\tau}_x^{(g)} + \Lambda_x^{(g)} \boldsymbol{\xi}^{(g)} + \boldsymbol{\delta}^{(g)}, \quad (2)$$

where $\mathbf{x}^{(g)}$ is the $Q \times 1$ vector of observed exogenous variables in group g , $\boldsymbol{\tau}_x^{(g)}$ is the $Q \times 1$ vector of intercept terms, $\boldsymbol{\xi}^{(g)}$ is the $N \times 1$ vector of latent exogenous factors, $\Lambda_x^{(g)}$ is the $Q \times N$ matrix of factor loadings, and $\boldsymbol{\delta}^{(g)}$ is a $Q \times 1$ vector of random errors, again assumed to be uncorrelated with the latent factors and to have zero

expectation. The third equation defines the structural model:

$$\eta^{(g)} = \alpha^{(g)} + \mathbf{B}^{(g)}\eta^{(g)} + \Gamma^{(g)}\xi^{(g)} + \zeta^{(g)}, \quad (3)$$

where $\alpha^{(g)}$ is an $M \times 1$ vector of intercept terms, $\mathbf{B}^{(g)}$ is the $M \times M$ weight matrix of the regression among the endogenous factors in group g , $\Gamma^{(g)}$ is the $M \times N$ weight matrix of the regression of the endogenous on the exogenous factors, and $\zeta^{(g)}$ is an $M \times 1$ vector of equation errors. Expectations of \mathbf{y} and \mathbf{x} are

$$\mu_y^{(g)} = \tau_y^{(g)} + \Lambda_y^{(g)} (\mathbf{I} - \mathbf{B}^{(g)})^{-1} (\alpha^{(g)} + \Gamma^{(g)}\kappa^{(g)}), \quad (4)$$

$$\mu_x^{(g)} = \tau_x^{(g)} + \Lambda_x^{(g)} \kappa^{(g)}, \quad (5)$$

with $\kappa^{(g)}$ the $N \times 1$ vector of latent exogenous factor means and $(\mathbf{I} - \mathbf{B}^{(g)})^{-1} (\alpha^{(g)} + \Gamma^{(g)}\kappa^{(g)})$ the $M \times 1$ vector of latent endogenous factor means. Finally, the $(P+Q) \times (P+Q)$ model-implied covariance matrix $\Sigma^{(g)}$ in the g th group is

$$\Sigma^{(g)} = \begin{pmatrix} \sigma_{yy}^{(g)} & \sigma_{yx}^{(g)} \\ \sigma_{xy}^{(g)} & \sigma_{xx}^{(g)} \end{pmatrix}, \quad (6)$$

where

$$\sigma_{yy}^{(g)} = \frac{(g)}{y} (\mathbf{I} - \frac{(g)}{y} \mathbf{B}^{(g)})^{-1} \left(\frac{(g)}{y} \sigma_{\epsilon}^{(g)} + \frac{(g)}{\epsilon} \right) \left[(\mathbf{I} - \frac{(g)}{y} \mathbf{B}^{(g)})^{-1} \right] \frac{(g)}{y} + \frac{(g)}{\epsilon}, \quad (7)$$

$$\sigma_{yx}^{(g)} = \frac{(g)}{y} (\mathbf{I} - \frac{(g)}{y} \mathbf{B}^{(g)})^{-1} \frac{(g)}{y} \sigma_{\epsilon}^{(g)} \frac{(g)}{x}, \quad (8)$$

$$\sigma_{xy}^{(g)} = \frac{(g)}{x} \frac{(g)}{y} \frac{(g)}{x} \left[(\mathbf{I} - \frac{(g)}{y} \mathbf{B}^{(g)})^{-1} \right] \frac{(g)}{x}, \quad (9)$$

$$\sigma_{xx}^{(g)} = \frac{(g)}{x} \frac{(g)}{x} \frac{(g)}{x} + \frac{(g)}{\delta}, \quad (10)$$

with $\Psi^{(g)}$ being the $M \times M$ covariance matrix of equation errors in group g , $\Phi^{(g)}$ the $N \times N$ covariance matrix of the exogenous factors, $\Theta_{\epsilon}^{(g)}$ the $P \times P$ covariance matrix of random measurement errors in $\mathbf{y}^{(g)}$, and $\Theta_{\delta}^{(g)}$ the $Q \times Q$ covariance matrix of random measurement errors in $\mathbf{x}^{(g)}$.

Each of the ten parameter matrices $\Lambda_x^{(g)}$, $\Lambda_y^{(g)}$, $\tau_x^{(g)}$, $\tau_y^{(g)}$, $\Phi^{(g)}$, $\Theta_{\delta}^{(g)}$, $\Theta_{\epsilon}^{(g)}$, $\Gamma^{(g)}$, $\mathbf{B}^{(g)}$, $\Psi^{(g)}$, $\kappa^{(g)}$, and $\alpha^{(g)}$ can be invariant across groups g (Meredith, 1993; Steenkamp & Baumgartner, 1998). In the following, the model will first be estimated separately for the pre-campaign survey and the post-campaign survey, using the maximum likelihood estimator in LISREL 8.30 (Jöreskog & Sörbom, 1996; Jöreskog, Sörbom, du Toit & du Toit, 1999).

Then, the parameter matrices will be successively constrained across the two samples, yielding a strictly hierarchical sequence of increasingly constrained models. The decrements in model fit will be evaluated by means of a χ^2 -difference test (Steiger, Shapiro & Browne, 1985).

3 RESULTS

3.1 Model specification

The same basic model structure was specified in both samples. The measurement model of the exogenous variables included four latent factors: (a) attitude towards fresh fish, measured by items ATT-1, ATT-2, ATT-3 and ATT-4, (b) family norms, measured by items FNO-1 and FNO-2, (c) availability in shops, measured by item AVA-1, and (d) meal preparation skills, measured by items SKI-1, SKI-2, SKI-3, and SKI-4. Each item was assumed to load on one factor only (simple structure). All measurement errors were assumed to be uncorrelated. Since measurement errors are only identified when at least two items serve as observed indicators of a latent factor, the measurement error in the single-indicator item AVA-1 was fixed to zero. All latent factors were allowed to correlate.

The measurement model of the endogenous variables included two latent factors: (a) intention to buy fresh fish, measured by items IBF-1, IBF-2, and IBF-3, and (b) consumption frequency, measured by item CFR-1. Again, we assumed a simple-structure loading pattern and uncorrelated errors. The measurement error in the single-indicator item CFR-1 was fixed to zero. The structural model assumed direct as well as indirect (mediated by intention to buy fresh fish) effects of (a) attitude towards fresh fish, (b) family norms, (c) availability in shops, and (d) meal preparation skills on consumers' reported consumption frequencies.

Starting from an initial model where only the factor pattern was assumed to be invariant, but all other parameters were allowed to differ between samples, the parameters were successively constrained in twelve steps: (1) Λ_x invariant, (2) Λ_y invariant, (3) τ_x invariant, (4) τ_y invariant, (5) Φ invariant, (6) Θ_{δ} invariant, (7) Θ_{ϵ} invariant, (8) Γ invariant, (9) \mathbf{B} invariant, (10) Ψ invariant, (11) κ invariant, and (12) α invariant across samples. Steps 1 through 7 yield models where the invariance of measurement parameters is tested, whereas steps 8 through 12 yield models where the invariance of structural parameters is tested.

skewness and kurtosis statistics (Mardia, Kent & Bibby, 1980) were computed for the joint distribution of the 15 questionnaire measures within each sample.

3.2 Normality check

To check whether the distributional assumptions of maximum likelihood estimation were met, multivariate

Table 2: Tests for parameter invariance.

Target model	Invariance constraint	Goodness-of-fit statistics				Baseline model	Model comparison statistics				
		χ^2	Satorra-Bentler scaled χ^2	df	RMSEA		df	χ^2	p	Satorra-Bentler scaled χ^2	p
0	Pattern	430.351	406.815	154	.053						
1a	Λ_x (partial)	437.060	414.958	157	.053	0	3	6.709	.082	8.206	.042
1b	Λ_x (full)	462.100	439.694	161	.055	1a	4	25.040	.000	26.070	.000
2	Λ_y	462.457	441.754	163	.054	1b	2	.357	.837	.498	.780
3	τ_x	474.312	453.005	170	.054	2	7	11.855	.105	11.280	.127
4	τ_y	476.658	455.651	172	.053	3	2	2.346	.309	2.426	.297
5	Φ	490.448	470.061	182	.052	4	10	13.790	.183	13.840	.180
6	Θ_δ	721.324	715.938	192	.069	5	10	230.876	.000	650.190	.000
7	Θ_ϵ	778.835	718.000	195	.068	6	3	57.511	.000	9.544	.023
8	Γ	808.413	743.685	203	.068	7	8	29.578	.000	25.871	.001
9	B	812.395	750.127	204	.068	8	1	3.982	.046	14.995	.000
10	Ψ	819.024	755.227	206	.068	9	2	6.629	.036	5.373	.068
11	κ	857.174	793.508	210	.069	10	4	38.150	.000	44.265	.000
12	α	940.620	866.518	212	.073	11	2	83.446	.000	50.873	.000

Note. Scaled χ^2 computed according to Satorra and Bentler (1988), RMSEA according to Steiger (1998), scaled χ^2 according to Satorra and Bentler (1999). Total $N = 1164$.

In the pre-campaign sample, the multivariate skewness was 56.942 ($Z = 60.998$, $p < .001$) and the multivariate kurtosis was 363.524 ($Z = 28.712$, $p < .001$). Taken together, the multivariate distribution departed significantly from normality ($\chi^2 = 4545.159$, $p < .001$). Similar conditions were found in the post-campaign sample (multivariate skewness = 38.047, $Z = 36.204$, $p < .001$; multivariate kurtosis = 306.435, $Z = 19.086$, $p < .001$; overall $\chi^2 = 1675.044$, $p < .001$).

To account for the serious violation of distributional assumptions, the Satorra-Bentler scaled χ^2 statistic will be used for evaluating model fit (Satorra & Bentler, 1988; see Hu, Bentler & Kano, 1992, for a robustness analysis). The statistic is obtained by dividing the normal-theory χ^2 by a scaling correction to better approximate the expected value of the χ^2 distribution under non-normality. Taking care of the fact that the difference between two scaled χ^2 values obtained from hierarchical models is *not*

distributed as χ^2 , Satorra (2000) and Satorra and Bentler (1999) have shown how their approach can be extended to χ^2 difference testing by applying another scale correction:

$$\frac{\text{Satorra-Bentler scaled } \chi^2}{\left(\frac{\chi^2(\text{Target}) - \chi^2(\text{Baseline})}{\text{Normal}} \right) \left(\frac{df(\text{Target}) - df(\text{Baseline})}{\text{Normal}} \right)} = \frac{\frac{\chi^2(\text{Target})}{\text{Scaled}} - \frac{\chi^2(\text{Baseline})}{\text{Scaled}}}{\frac{df(\text{Target})}{\text{Scaled}} - \frac{df(\text{Baseline})}{\text{Scaled}}} \quad (11)$$

3.3 Estimation and goodness of fit

All models were estimated by maximum likelihood using LISREL 8.30 (Jöreskog & Sörbom, 1996; Jöreskog *et al.*, 1999). All models converged without problems. Goodness-of-fit statistics are presented in Table 2. The overall goodness-of-fit χ^2 and Satorra-Bentler scaled χ^2 statistics are of limited use as stand-alone measures –

being a function of sample size, they tend to gain excessive power in large samples (Bentler, 1990).

The root mean squared error of approximation (RMSEA; Steiger, 1998, 1990) will instead be used to evaluate model-wise goodness of fit. The RMSEA is a relative non-centrality measure, estimating how well the fitted model approximates the population covariance matrix per degree of freedom. Cudeck and Browne (1993) suggest taking RMSEA values below .080 as an indicator of acceptable fit, and values below .050 as an indicator of close fit. Evaluated according to these criteria, all models yielded acceptable goodness-of-fit values, with RMSEA values steadily increasing as more constraints were imposed on the models. The only major leap occurred in the transition from Model 5 to Model 6, when invariance of error variances was imposed on the measurement models.

3.4 Model comparisons

Explicit model comparisons provide a statistically more satisfying means of evaluating particular invariance constraints. In Table 2, both the standard normal-theory χ^2 difference test (Steiger, Shapiro & Browne, 1985) as well as the more robust Satorra-Bentler scaled χ^2 difference test (Satorra, 2000; Satorra & Bentler, 1999) are reported.

Both tests indicated significant deterioration of model fit when the factor loadings of the exogenous variables were constrained to be invariant across samples (Model 1b), when the measurement errors of the exogenous (Model 6) and endogenous (Model 7) variables were constrained, when the weights of the regression of endogenous on exogenous (Model 8) as well as endogenous on endogenous variables (Model 9) were constrained, when the equation errors were constrained (Model 10), and, finally, when the means of the latent endogenous (Model 11) and exogenous factors (Model 12) were constrained across samples.

3.5 Partial invariance modification

An especially desirable parameter structure is one where factor loadings (Λ_x and Λ_y) and item intercepts (τ_x and τ_y) are invariant across samples, yielding a congeneric measurement model (Lord & Novick, 1968) with group-invariant location and scale parameters. If the constraints hold, the observed variables are measured on common interval scales and can be meaningfully compared across samples (Meredith, 1993).

The above results suggest that this was indeed the case for the factor loadings of the endogenous variables and the intercepts of the exogenous and the endogenous variables, but not for the factor loadings of the exogenous variables. Byrne, Shavelson and Muthén (1989; also see Steenkamp and Baumgartner, 1998) have shown that the existence of *two items per factor* with invariant loadings and intercepts is already sufficient to invoke a common interval scale on which the latent factor means are measured (“partial invariance”). So for each exogenous factor, the two factor loadings with the lowest between-samples variance were selected and constrained to be invariant (Model 1a).

As shown in Table 2, the Satorra-Bentler scaled χ^2 difference test does not suggest significant deterioration of model fit as compared to Model 0, whilst the normal-theory χ^2 difference test does so. However, robustness studies have indicated that the normal-theory χ^2 test becomes overly conservative under non-normality (as opposed to radical; see Hu, Bentler & Kano, 1992), so that the Satorra-Bentler scaled χ^2 difference test should provide the more accurate decision here.

3.6 Final estimates

For the final estimation step, all parameters for which the above model comparisons had suggested invariance were constrained to be equal across samples: Λ_x partially invariant, and Λ_y , τ_x , τ_y and Φ fully invariant. All other parameters were allowed to vary between samples. The results are shown in Figure 1 (common metric completely standardized solution).

In the pre-campaign sample, the only significant structural relationships were direct effects of availability in shops ($t = 1.760$, $p[\text{one-tailed}] < .05$) and meal preparation skills ($t = 2.045$, $p[\text{one-tailed}] < .05$) on consumption frequency, and an additional “global” effect of intention to buy fresh fish ($t = 2.714$, $p[\text{one-tailed}] < .01$) on consumption frequency that was not preceded by any significant effects on intention.

In the post-campaign sample, the effects of availability in shops and meal preparation skills vanished (all t s non-significant). Instead, family norms had a significant direct effect on consumption frequency ($t = 1.723$, $p[\text{one-tailed}] < .05$) and also a significant indirect effect, mediated by intention to buy fresh fish ($t = 3.232$, $p[\text{one-tailed}] < .001$ for the effect of family norms on intention, and $t = 1.723$, $p[\text{one-tailed}] < .05$ for the effect of intention on consumption frequency).

standard deviations ($t = 5.215, p[\text{one-tailed}] < .001$).

Finally, the means of the latent endogenous factors showed significant change over time. The latent mean of intention to buy fresh fish increased by $d = .113$ standard deviations ($t = 1.913, p[\text{one-tailed}] < .05$), and the latent mean of consumption frequency increased by $d = .307$

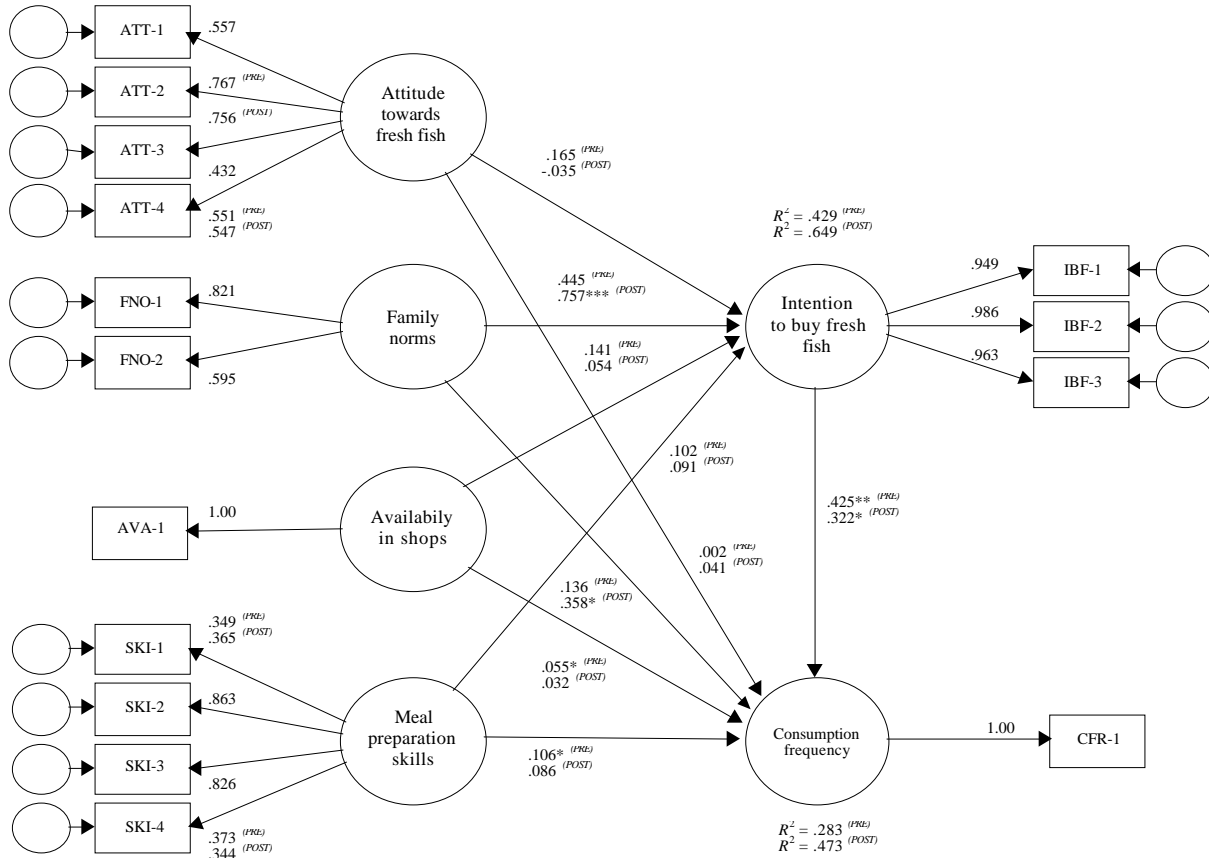


Figure 1: Final parameter estimates (common metric completely standardized solution).

4 DISCUSSION AND CONCLUSIONS

4.1 Effects of the fish campaign

In substantial terms, there are four major results from the analysis presented above. Firstly, in the pre-campaign situation, we find that lack of availability of fish in shops and lack of perceived meal preparation skills have had a significant negative impact on the purchase of fresh fish. Secondly, after the campaign, the level of both intention

to buy fresh fish and of actual reported fish purchases has gone up. Thirdly, lack of availability and lack of meal preparation skills do no longer have a significant impact on neither intention nor consumption frequency. Fourthly, family norms had after the campaign a clearly stronger and significant impact on both intention and purchase frequency.

The disappearance of the effect of availability and meal preparation skills can be easily interpreted in terms of the campaign in conjunction with the introduction of MAP-

packaged fresh fish in supermarkets. The one major specific theme of the campaign was ease and convenience in having fish as a family meal.

The increased impact of family norms was not an intended aim of the campaign, but is post-hoc easily reconcilable with the way the campaign was executed. The two major characters in the campaign, *Gunnar* and *Minna*, became soon widely known popular heroes, and enjoyed not only widespread awareness, but were also subject of numerous discussions among families and colleagues. The characters were regarded as funny and sympathetic. For family members not personally dealing with shopping and cooking (and thus less affected by issues of availability and convenience), the positive affect related to the two main characters in the fish campaign may have acted as a peripheral cue (Petty & Cacioppo, 1981; Petty, Unnava & Stratman, 1991) with regard to the attitude towards fish. It is a well-established finding in advertising research that under low involvement conditions attributes of the advertisement (as opposed to the product advertised) may exert a positive influence on the attitude towards the product (Petty, Cacioppo & Schumann, 1983). This is what may have happened for family members in this case, leading the main shopper in the households to perceive an increased family demand to buy and prepare fish.

4.2 Generic food advertising in general

Generic advertising campaigns advocating increased consumption not of a particular brand, but of a generic product category, are quite numerous. They may be conducted based on commercial interests of a sector or based on health considerations, like attempts to promote higher consumption of fruit and vegetables. In the present case, both kinds of considerations played a role.

The present case reminds us that the benefits of consumption of a particular food category most relevant from a public policy point of view may not necessarily be those driving or inhibiting consumption. In the present case, basically everybody knew that fish was healthy. However, this did not turn into intentions to buy or actual consumption. The use of consumer research in the pre-campaign phase led to the identification of other major barriers to increased consumption of (fresh) fish.

The case also illustrates the complementary roles of generic campaigns and product development. Without the introduction of MAP-packaged fish filets in supermarkets, the observed effect would probably not have occurred. Generic campaigns have the inherent weakness that they

deal with an array of products, which may vary in quality, price, availability and other relevant parameters.

Finally, the case illustrates the multiple effects advertising can have. While only the effects on the main shoppers in households were measured, the changing importance of the 'family norms' construct suggests that the campaign may have affected main shoppers and other family members in different ways: by providing relevant information about fish (central route) for main shoppers, and by providing entertaining, humorous characters (peripheral route) for other family members.

4.3 Campaign evaluation methodology

Our approach using a multi-sample structural equation model differs in one important way from most common approaches to evaluating campaigns: we evaluated effects not only in terms of levels of variables (as manifested in changes of means), but also in terms of changes in the structure of the determinants of buying behavior. Looking at changes in levels of determinants of behavior before and after a campaign implicitly assumes that the structure of the determinants of the behavior has remained unchanged during the campaign. As our results show, this is not necessarily a good assumption to make. We could conclude that two constructs that were inhibitors of buying fish in the pre-campaign phase became unrelated to buying behavior after the campaign.

It is an interesting area for future research to look at whether changes affecting the level or changes affecting the structure of determinants lead to more stable campaign effects. A possible argument could be that changes in structure are more immune with regard to changes in the underlying belief structure than changes in the levels of major determinants of behavior.

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