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CONSUMER PREFERENCES FOR ICED COFFEE PRODUCTS

TITLE:

Consumer preferences for iced coffee determined by conjoint analysis:
An exploratory study with Norwegian consumers

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SUMMARY

The main aim of this paper is to investigate consumer preferences for extrinsic attributes of iced coffee, explore consumers’ coffee consumption habits, find new market opportunities and segment consumers based on similar products preferences. A sample of 101 consumers of iced coffee was recruited during 2012 in Norway. Twelve iced coffee products combining different levels of attributes: coffee type, origin, calories and price were presented on screen and rated according to consumers’ willingness to buy (WTB). Mixed Model ANOVA, Principal Component Analysis (PCA) and Partial Least Squares Discriminant Analysis (PLS-DA) were applied to analyze data. Results show that the most preferred products for the consumer sample as a whole were low price – low calorie products while age has a significant effect on WTB for different iced coffee products. Four different consumer segments based on type of iced coffee and country of production preferences were identified and discussed.

KEYWORDS

Iced coffee, Conjoint Analysis, Rating, Willingness to buy, Consumers preference, Segmentation, Norway.

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INTRODUCTION

Iced coffee is now increasing its consumption in Scandinavian countries which have the world’s highest levels of coffee consumption (International Coffee Organisation, 2011). Since the early 1980s, iced coffee has been very popular in the USA, Greece and Japan as a refreshing drink where it is usually drunk in small bottles for take-away consumption, or enjoyed for quenching thirst while sitting outside at a café (Petit & Sieffermann, 2007). In 1999 one of the main Norwegian food companies started introducing various types of iced coffee on the food market, and several other brands have followed since this product category has grown in popularity in the recent years. As the iced coffees on the Norwegian market do not have much variety except for the different types of coffee, more information is needed for understanding consumer preferences and choice attributes for this type of product. In addition, since Norwegian consumers have sensory experience with iced coffee, it is highly relevant to consider the impact of various factors such as nutritional, economic, ethnocentric and sensory properties. To the best knowledge of the authors, no studies are available which investigate the consumption of iced coffee in Norway, with particular reference to extrinsic factors affecting consumption. Petit & Sieffermann (2007) investigated the effect of the physical testing environment on liking and consumption of iced coffee by French consumers. With regard to consumer motivations and attitudes, there is a general lack of studies that investigate consumer preferences and motivation for coffee consumption (Rozin & Cines, 1982), with the exception of fair trade or environmentally friendly coffee (De Pelsmacker, et al., 2005; Raynolds, 2004). One of the most applied predictive statistical model which determine consumer response towards different product profiles is Conjoint Analysis (Annunziata & Vecchio, 2013; De Pelsmaeker, Dewettinck, & Gellynck, 2013; Saito & Saito, 2013). CA is defined as a method for analyzing the effect of a number of designed factors (e.g. packaging, information factors, etc.) on consumer acceptance or choice (Næs, Brockhoff, & Tomic, 2010). CA includes a set of techniques able to measure buyers’ tradeoffs among multiattribute products or services, including foods (Claret et al., 2012; Cox, et al., 2007; Næs, et al., 2010; Næs, et al., 2010a). CA is used to estimate the structure of consumer evaluations on a set of product profiles consisting in predetermined combinations of product attributes (Green &
Srinivasan, 1978). In this paper, we will use Willingness To Buy (WTB) ratings collected on a 9-point category scale ranging from 1 “I would definitely not buy” to 9 ”I will definitely buy”. In CA, relating consumer preferences to individual differences in demographics, attitudes, habits, etc. is important, because it helps to understand consumer behaviour and provides useful information for improving the process of product development and developing targeted marketing strategies (Endrizzi, Menichelli, Johansen, Olsen, & Næs, 2011). The data presented in this paper are extracted from a large consumer experiment conducted in Norway during autumn 2012. In particular, this paper investigates consumers’ preferences for iced coffee varying in several extrinsic attributes. This information is particularly useful for iced coffee producers in Scandinavia, considering Scandinavia have the world’s highest levels of consumption. In the present paper, only the data concerning the rating group of participants will be investigated.

The paper addresses four questions: (i) What type of iced coffee attributes increases consumers' willingness to buy, (ii) Are coffee consumption habits related to iced coffee consumption habits, (iii) Do conjoint experimental results match self-reported purchase habits for iced coffee and (iv) What are the main iced coffee preference (WTB) segments and who are the people in each of these segments. To achieve this goals the study was organized in two complementary steps: (i) a qualitative approach and (ii) a quantitative approach. The qualitative approach aimed to identify, by means of, which attributes and levels were considered the most relevant in a decision-making process when choosing iced coffee. The quantitative approach applied CA to determine consumer preference for the different levels of the selected attributes, and the relative importance that these attributes have for iced coffee buyers. The quantitative study was completed with a socio-demographic, attitudinal and behavioural questionnaire focusing in particular on iced coffee and (warm) coffee consumption habits.

**MATERIAL AND METHODS**

**Focus group: selection of attributes and levels**

...
A discussion was carried out in October 2012 in the South of Norway, in order to identify the most relevant attributes that Norwegian consumers take into account when purchasing iced coffee. The participants were 10 people (N=10) aged between 21 and 56 years. Consumers were selected based on three main criteria: age, gender, and frequency of buying/drinking iced coffee. The FG was basically structured in two different topics. The first topic concerned the description of situation of buying/drinking iced coffee, such as motivations for buying/drinking, location, type of outlet, alone/with other people, time of the day, flavors, prices, brands, packaging, and quantity. The second topic regarded the characteristics of a typical iced coffee drinker, such as age, lifestyle, etc. The FG discussion was conducted by an experienced moderator while an assistant took notes. The most relevant attributes and levels from a consumer perspective were identified and selected to design the conjoint study. Moreover, the FG provided inputs on iced coffee consumption habits that were used to develop the conjoint study.

**Conjoint study**

**Participants**

A sample of 101 consumers (N=101) were recruited in the region South of Oslo (Norway) in November 2012 with an on-line recruitment questionnaire using the EyeQuestion system (Logic8 BV, The Netherlands). Consumers were recruited according to three main criteria: usage frequency of iced coffee, gender, and age. Regular consumers of iced coffee aged between 20 and 60 years were selected to take part in the experiment. Finally, for each participating consumer a reward of NOK 300 was attributed to the leisure time organization or club of their choice.

**Consumer test**

The consumer test was held in the sensory lab of Nofima (Ås, Norway) and included four sessions. In the introductory session, a sample of iced coffee was served to the consumers in neutral plastic cups in order to focus the consumers on the product as a warm up sample. In the second session, the conjoint task, consumers rated their probability of buying for different iced coffee profiles presented on screen in the
form of mock-up products. This session is described in details below. The third session involved hedonic ratings on iced coffee samples and is not investigated in this paper. The last session consisted in a questionnaire investigating the consumers’ consumption habits for coffee and iced coffee (frequency, location, usage of cream/sugar, etc.) and some socio-demographic characteristics. The participants were seated in separate booths. Data collection was performed on individual computers in the EyeQuestion system (Logic8 BV, The Netherlands).

Selection of iced coffee attributes and levels: conjoint analysis design and iced coffee samples

Based on the results obtained from the FG attributes were selected: coffee type, calories, origin and price. Regarding coffee type, two different levels were chosen: “Espresso” and “Latte” as they are among the most frequently consumed coffee types in Norway and they represent two distinct strengths of coffee taste. With concern to the calories, the FG discussion highlighted the importance of calories in consumer choice especially for older consumers. The two levels of calories (“60” and “90 kcal/100 ml”) were chosen based on typical calorie levels of iced coffee products that are present on the market. Concerning the country of origin two levels were chosen: “Norway” as the market leader is a Norwegian company, and “Italy” due to its high reputation for coffee products. Finally, as purchasing prices three different levels were chosen, thus representing the high, middle and low end of the prices in the Norwegian market for iced coffee products (“NOK 17”, “NOK 23” and “NOK 29”, approximately from € 2.2, € 3 and € 3.8 per unit). Full factorial design was not appropriate in the present study due to the large number of possible factor and level combinations (2 x 2 x 2 x 3 = 24) that should be presented to consumers. In order to effectively test the attribute effects on buyer’s preference while reducing the number of product profiles presentations, a fractional factorial design of 12 hypothetical products was constructed (Table 1). This orthogonal array design was created by using the statistical package SAS version 9.3.

Conjoint analysis data collection
Photographs of 12 mock-up products, one for each product profile were created and presented monadically on computer screen and following a balanced randomized order across consumers. Prior to the task, a standard profile picture was shown pointing at the four attributes of interest (only indicating “country”, “price”, “calories” and “coffee type” without any specific level) in order to make participants aware of the location of relevant information on the pictures. For each picture, consumers’ probability of buying was elicited with the question: “Imagine that you are purchasing iced coffee. How likely is it that you would buy this particular iced coffee?”. Answers were gathered on a 9-point scale from 1 (Extremely unlikely) to 9 (Extremely likely).

Statistical data analysis

The conjoint rating data were analysed with the purpose to identify significant effects at population level, then define and characterise consumer segments based on individual preferences. This was achieved by applying the following statistical models: Mixed Model ANOVA, Principal Component Analysis (PCA) and Partial Least Squares Discriminant Analysis (PLS-DA).

Mixed model ANOVA

In conjoint experiments based on rating scales, the population effects from consumer evaluations are typically analyzed by mixed model ANOVA (Næs et al., 2010). This model includes Calories, Coffee, Origin and Price as main effects, and of the six possible two-way interaction effects the following four were included: Price*Calories, Coffee*Calories, Calories*Origin and Price*Coffee. These main effects and interactions were included as fixed factors, while a Consumer effect was included as random factor. Furthermore, random interaction effects between Consumer and the four factors were included to account for individual preferences. The model is written:
Probability of buying = Mean + Consumer + Price*Calories + Coffee*Calories + Calories*Origin
+Price*Coffee+Consumer*Coffee+Consumer*Calories + Consumer*Origin+
Consumer*Price + random noise

Mixed model ANOVA was run in Minitab v. 16.2.3 (Minitab Inc.). Further details can be found in SM1.

**Segmentation: PCA and PLS-DA**

PCA and PLS regression are statistical methods that allow to interpret complex multivariate data in a manageable and useful way (Cadena, Cruz, Faria, & Bolini, 2012; Cruz et al., 2011; Souza et al., 2011). These methods determine latent variables which are linear combinations of original measured variables. Taking advantage of variable correlations, the methods reduce the dimensionality of the original data and summarize it to structured information.

We conducted a segmentation of consumers based on individual preferences by applying PCA on the WTB matrix. Then, common socio-demographic and behavioural characteristics were investigated within segments by performing Partial Least Squares Discrimination Analysis (PLS-DA). Further details can be found in SM2.

**RESULTS AND DISCUSSION**

**Sample description: socio-demographic characteristics**

The sample includes 101 consumers (N=101). Around 2/3 were women while in terms of age consumers were between 19 to 57 years with a mean of 35 years. Concerning the area of living, almost 75% live in towns while 25% live in cities or countryside. In terms of occupation, about 39% were students while 60% had a professional occupation.

**Drivers of iced coffee consumption**
The four main drivers that lead consumers to drinking iced coffee are “I want to indulge myself” followed by “It will keep me awake” and “I need new energy” (Figure 1). Therefore consumers’ main motivations for iced coffee consumption are enjoyment and relaxation, as well as energy and caffeine intake.

**Most preferred iced coffee products**

In order to identify the most preferred type of iced coffee for the consumer sample as a whole, we analyzed the willingness to buy (WTB) of consumers for the twelve different iced coffee products by applying the mixed model ANOVA as described above. The residuals approximate a normal distribution quite well supporting the tests below for indicating the relative importance of the factors.

The ANOVA model is significant (p<0.01) which means that there are significant statistical differences on WTB among the twelve iced coffee products presented to consumers. Then, Tukey’s test was computed to discover which of the 12 presented iced coffee products consumers were most willing to buy. The most preferred product is P11 (Latte, low calories, produced in Italy and at the lowest price) followed by P4 (Espresso, low calories, produced in Norway and at the lowest price) and P3 (Latte, low calories, produced in Norway and at medium price). Accordingly, no systematic preferences emerge in terms of iced coffee type and country of production. This hints to the presence of consumer segments with diverging preferences, as will be investigated below.

**Population effects**

**Main effects**

The mixed model ANOVA results shows that both calories and price present significant effects (p-values <0.01), while the factors coffee and origin are not statistically significant at a 5% level. The significant effects are estimated to be negative, that is to say that consumers on average prefer low calories and low prices to high calories and higher prices (Figure 2). Based on the fitted model, consumers’ WTB increase by 12.6% (0.5 units on the 9-point WTB scale) when reducing calorie content from 90 kcal/100 ml to 60 kcal/100 ml and consumers’ WTB increase by 37.7% (1.5 units on the 9-point WTB scale) when reducing
price from 23 NOK to 17 NOK per 250 ml (Figure 2). These results indicate that there may be a market potential for calorie reduced iced coffee products. It is however important to note that in this experiment, product profiles were presented on-screen without involving tasting. Research studies have demonstrated that low calorie products often perform poorly in hedonic tests compared to their full calorie counterparts (Ares, et al., 2008; Roininen, et al., 2000).

**Interaction effects**

Only one interaction between conjoint factors is significant: Calories*Price, confounded with Coffee*Origin (p-values <0.01). The confounding means that it is not statistically possible to identify which of the two interactions is observed, presents both these potential interactions. Consumers on average are more reluctant to pay increasing prices for iced coffee products at low calorie content, decreasing their WTP faster than for high calorie content and has a preference for Espresso iced coffee is associated with a preference for production in Norway. On the other hand, preferences for Latte iced coffee are independent of production origin. Note that as both Calories and Price show significant main effects on consumer’s WTB, while neither Coffee nor Origin showed significant main effects, it is reasonable to identify the observed interaction effect as that of Calories*Price.

**Preference heterogeneity and consumer segmentation**

**Coffee type and Origin segments**

In order to determine consumer segments based on individual preference patterns in the conjoint rating task, a PCA model was run on the data matrix of consumers’ Willingness To Buy (WTB) for each product profile as described above. We identified four Principal Components (PCs): coffee type (on PC1, restituting 37% of the variance), price (on PC2, 24%), origin (on PC3, 12%) and calories (on PC4, 8%). Further details can be found in SR1. Thus consumers mostly differed in their coffee type preferences, such that it is interesting to conduct a consumer segmentation on that attribute. Further details can be found in SR2. Figure 3 shows the PCA correlation loadings plot for PC1 and PC3, where distinct product groups appear according to coffee type and origin attribute levels.. We created manually four consumer
segments directly corresponding to the distribution of consumers in the four quadrants. As the clusters were defined based on consumers’ similarity of WTB for attributes coffee type and origin, they will be referred to as “Latte/Italy” (26 consumers), “Espresso/Italy” (24 consumers), “Espresso/Norway” (30 consumers) and “Latte/Norway” (21 consumers).

**Segment characteristics**

**WTB product profiles**

The four consumer segments are presented by calculating their respective mean WTB values for each of the factors investigated (Figure 4a-d). The two Latte groups clearly prefer iced coffee “Latte” to “Espresso” and vice versa for the Espresso groups. All segments prefer low calories to high calories iced coffee while the production origin plays a role in segmenting consumers in the four identified groups, and finally all segments prefer lower prices. To describe the consumer segments by socio-demographic characteristics, warm coffee consumption habits and iced-coffee consumption habits, a PLS-DA approach was applied as described above. In the following, only statistically significant results are reported.

**Personal attributes**

Results indicates significant relationships between age and the first segment (Latte/Italy) and the fourth segment (Espresso/Norway) but in opposite directions. More specifically, younger consumers are more attracted to Latte iced coffee from Italy, while older consumers prefer Espresso iced coffee from Norway. In terms of general characteristics such as health conscious, ethnocentrism, taste, place of living (e.g. countryside, city), gender and BMI we did not detect any significant difference among the four segments.

**Warm coffee habits**

With regard to warm coffee consumption habits, four sub-groups of variables successfully discriminated the consumer segments: **Warm coffee type, Cream & sugar, Consumption frequency and Location.** Results shows that from a general perspective there is a strong relationship between warm coffee habits
and iced coffee preferences reflected in the segments belonging. For example, consumers in Espresso/Norway segment show the highest consumption of “Regular”, “Espresso” and “Americano” warm coffee types, and the lowest consumption of “Latte”. An opposite relationship has been found for segment “Latte/Italy”. Further details can be found in SR3.

Iced coffee habits

The PLS-DA results indicate that none of the iced coffee characteristics investigated, such as when drinking during the day (e.g. wake up, afternoon, etc.), location of drinking (e.g. home, work, university, etc.), motivation of drinking (e.g. thirsty, energy, etc.), frequency consumption, how long drink, etc. significantly differentiated the four consumer segments. The questionnaire also investigated consumers’ purchase habits in terms of brands and iced coffee types, with special emphasis on a Norwegian brand (A) and a foreign brand (B). Results show that consumers in Latte/Italy and Latte/Norway segments were regular purchasers of a Latte product from brand A, while this product was negatively linked to segment Espresso/Norway.

Consumers in segment Latte/Norway were also purchasers of a caramel flavored product from brand B, while the same product was significantly not characteristic of purchases by consumers in segments Espresso/Italy and Espresso/Norway. On the other hand, these groups typically purchased a caffeine-rich product from brand A which was not consumed by consumers in segments Latte/Italy and Latte/Norway.

Conclusively, there is a clear consistence between consumers’ iced coffee product choices in real life and their willingness-to-buy ratings from the conjoint experiment, which are reflected in their segment belonging.

CONCLUSIONS

This study aimed at exploring consumers’ iced coffee consumption habits and investigating consumer preferences for extrinsic attributes of iced coffee. Since our aim was not to provide representative data for all the country, but rather it was to explore the relationships among variables (e.g. coffee habits, purchase
motivations, etc.) we state a positive argument for the validity of our results related to sample size (N=101). Experience from literature shows that above N=100 consumers a sample is good enough for detecting important effects. This validity is also supported by the fact that the results (ANOVA) are significant. A larger sample was impossible for economic reasons while we did not provide any economic benefits for consumers, therefore no social bias. Results show that the most preferred products for the consumer sample as a whole were low price – low calorie products. This indicates that there may be a market potential for calorie reduced iced coffee products. Further, four consumer segments were identified that differed in coffee type and production origin preferences: Latte/Italy, Latte/Norway, Espresso/Italy and Espresso/Norway. In terms of personal and socio-demographic characteristics attributes investigated, only age has a significant effect on consumer’s WTB various coffee types: younger consumers present higher WTB for “Latte” products while older consumers show higher WTB for “Espresso” and vice versa. None of the other personal characteristics investigated, such as health conscious, ethnocentrism, taste, place of living (e.g. countryside, city), gender and BMI present significant effect on WTB of the four segments.

The two consumer groups attracted by the espresso mock-ups reported a high warm coffee consumption and typically purchase iced coffee products with a high caffeine content. The two consumer groups attracted by the latte mock-ups reported lower warm coffee consumption levels, usually add milk, cream and/or sugar in their coffee, and typically purchase latte iced coffee products with low caffeine content and flavoured iced coffee products. Thus, there is a clear consistence between consumers’ attributes preferences in the conjoint experiment, their real life choices in terms of iced coffee and their warm coffee consumption habits.

Finally, since we did not find in the literature any similar studies about iced coffee it is not possible to compare our findings with other researches. Future researches maybe conduct similar studies in other countries to compare the results and investigate whether the willingness to buy for low calorie iced coffee products persists after product tasting and product exposure over time. Therefore, a final recommendation for further research is also to refine a methodology that incorporate sensory characteristics within conjoint
analysis in order to provide more valuable information and asset for the food industry (De Pelsmaeker et al., 2013).

ACKNOWLEDGEMENTS

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REFERENCES


Running title: CONSUMER PREFERENCES FOR ICED COFFEE PRODUCTS


Table 1 – Hypothetical iced coffee profiles obtained by means of the orthogonal array design.
## Table 1

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>TYPE OF COFFEE</th>
<th>CALORIES (kcal/100 ml)</th>
<th>COUNTRY OF ORIGIN</th>
<th>PRICE (NOK)</th>
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<tr>
<td>1</td>
<td>Espresso</td>
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<td>Italy</td>
<td>Kr. 29,-</td>
</tr>
<tr>
<td>2</td>
<td>Latte</td>
<td>90</td>
<td>Norway</td>
<td>Kr. 23,-</td>
</tr>
<tr>
<td>3</td>
<td>Latte</td>
<td>60</td>
<td>Norway</td>
<td>Kr. 23,-</td>
</tr>
<tr>
<td>4</td>
<td>Espresso</td>
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<td>Norway</td>
<td>Kr. 17,-</td>
</tr>
<tr>
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<td>Norway</td>
<td>Kr. 29,-</td>
</tr>
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</tr>
<tr>
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<td>Kr. 17,-</td>
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<td>8</td>
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<td>Kr. 17,-</td>
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<tr>
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<td>Kr. 23,-</td>
</tr>
</tbody>
</table>
FIGURE LEGENDS

Figure 1 – Iced coffee consumption motivations expressed in percentage frequency with standard errors

Figure 2 – Main effects of the four factors in conjoint rating. Calories and Price have significant main effects while Coffee and Origin do not.

Figure 3 – PCA correlation loadings showing sample and consumer distributions according to attributes Coffee (PC1) and Origin (PC3)

Figure 4 – Average WTB value and standard errors on mock-up products varying in attributes a) Coffee type, b) Calories, c) Origin and d) Price for each of the four consumer segments
Figure 1
Figure 2
Figure 3
Figure 4
SUPPLEMENTARY MATERIAL AND METHODS

SM1 - Mixed model ANOVA

ANalysis Of VAriance (ANOVA) is one of the most used methodologies when investigating product differences in sensory and consumer studies since the main purpose of this method is to identify and quantify the factors that are responsible for the variability of the response (Næs, Brockhoff, et al., 2010).

In the model applied, note that interactions Price*Calories and Price*Coffee are confounded with Coffee*Origin and Price*Origin, respectively.

SM 2 – Segmentation details

In order to conduct a consumer segmentation based on individual preferences, PCA was applied on the WTB matrix presenting product profiles in rows (P1, P2,…,P12) and consumers in columns (C1, C2,…,C101) (Table S1). The data were centered and scaled column wise to correct for different scale usage across consumers. Segmentation was performed by visual delimitation of consumer groups based on the PCA loadings of selected principal components. Defining groups visually from the consumer preference patterns displayed in PCA ensures that consumers sharing the same attribute preferences fall into the same segment, thus facilitating results interpretation.

Then, common socio-demographic and behavioural characteristics were investigated within segments by performing Partial Least Squares Discriminant Analysis (PLS-DA). Endrizzi et al., (2011) define PLS-DA as a method that relates acceptance patterns to external characteristics by identifying segments and relate them to the consumer characteristics using some type of discriminant analysis (PLS discriminant analysis; see e.g. (Barker & Rayens, 2003).
PLS-DA was conducted on the behavioural, coffee habits and socio-demographics questionnaire matrix presenting consumers in rows and questionnaire items in columns. The dependent variables were binary variables (0/1) coding for segment belonging (Table S2). Cross-validation and significance testing by jack-knifing at 5% level were used in order to detect significant predictor variables (Martens & Martens, 2000). As the questionnaire included several blocks of unrelated items (iced coffee habits, socio-demographics…), there is a risk of obtaining somewhat spurious conclusions. This was addressed by running several PLS-DA models, including either all blocks or selected subsets of blocks. Predictor variables that systematically showed significance in different models are reported here, while predictor variables with no stability across models were withdrawn. PCA and PLS-DA were conducted in the multivariate statistics software package The Unscrambler X 10.2 (Camo Software AS, Norway).
SUPPLEMENTARY RESULTS

SR 1 - Coffee type and Origin segments
Consumers did not really differ in their preferences for calorie content, indicating that the mean preference for low calorie content highlighted by the ANOVA is valid at individual level as well. As expected, results along PC2 showed a large majority of consumers projected in the direction of low price preferences (results not shown).

SR 2 - Coffee type and Origin segments
As a possible interaction of Coffee*Origin was detected in the mixed model ANOVA, consumer segments were defined on a criteria of common WTB values regarding attributes Coffee type and Origin.

SR 3 - Warm coffee habits
Firstly, consumers in segment Espresso/Norway show the highest consumption of “Regular”, “Espresso” and “Americano” warm coffee types, and the lowest consumption of “Latte”. An opposite relationship has been found for segment “Latte/Italy” (Figure S1). Secondly, consumers in segment Espresso/Norway typically consume warm coffee without any milk, cream or sugar, while consumers in segments Latte/Italy and Latte/Norway add such ingredients. Thirdly, consumers in segments Espresso/Italy and Espresso/Norway report the highest consumption frequency of warm coffee while consumers in segment Latte/Italy show the lowest consumption frequency. Finally, consumers in segments Espresso/Italy and Espresso/Norway typically report drinking warm coffee at their workplace or university, while consumers in segment Latte/Italy are characterized by not consuming warm coffee in these locations. These results are illustrated in Figure S1.

REFERENCES


TABLE LEGENDS
Table S1 – Structure of PCA data matrix for willingness to buy (WTB)
Table S2 – Structure of PLS-DA matrix for consumer segments description
Table S1 – Structure of PCA data matrix for willingness to buy (WTB).

<table>
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<tr>
<th>Products</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>...</th>
<th>P12</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
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</table>
Table S2 – Structure of PLS-DA matrix for segments description

<table>
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<tr>
<th>Consumers</th>
<th>Latte/Italy</th>
<th>Latte/Norway</th>
<th>Espresso/Italy</th>
<th>Espresso/Norway</th>
<th>Coffee habits</th>
<th>Iced coffee habits</th>
<th>Socio-demographics</th>
<th>Questionnaire items</th>
</tr>
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</tbody>
</table>
Figure S1 – PLS regression loadings plot of the main segment characteristics. LI: Latte/Italy, LN: Latte/Norway, EI: Espresso/Italy and EN: Espresso/Norway)
Figure S2