

A quantitative analysis of convenience-related food consumption in the Netherlands

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Abstract

A previously developed classification system for Home Meal Replacements (HMR) based on household convenience criteria was used to analyse the data from the 1997-98 Dutch National Food Consumption Survey (DNFCS). All the different HMR consumed by the 2.774 surveyed households during the survey period were classified in a 4x4 'shelf-life' by 'required preparation' matrix. The number of HMR consumption occurrences reported by the surveyed households that could be allocated to each class combination in the matrix system was tallied, as well as the number of consumption occurrences per product. The different HMR products consumed during the survey by the participating households were then arranged in a descending order by the number of consumption occurrences per product. Finally, six main types of HMR products, which together accounted for more than 70% of the total consumption occurrences during the survey, were sorted by its position within the matrix system. Results of this analysis indicate that the consumption of HMR products by Dutch households in 1997-98 was low and concentrated in a handful of products. The developed classification system proved to be a valuable framework for a convenience-based analysis of household food consumption. Moreover, it can be a useful tool in the analysis of convenience-related food consumption patterns based on household data.

1 Introduction

1.1 The need for speed

Of the many trends assigned to today's "Western" food consumer by marketers and manufacturers, lack of time is certainly the one we can least argue against. For most of the active population there is not much time to eat and even less for shopping and cooking. This trend has been extensively reported in EU countries, along with increasingly shorter shopping cycles (Dade 1992, Datamonitor 1998, McHugh *et al.* 1991, Ritson & Hutchins 1995). However, and in spite of the generalised "need for speed", consumers do not always seem ready to compromise the pleasure of eating a tasty meal for the sake of earning extra time. According to Sloan (1997), there are indeed situations in which consumers willingly spend time preparing and eating meals, for instance on weekends or if they have guests. Eating remains a key part of leisure or socialising, as well as a valued personal experience (Marshall 1995, Gofton 1995, Datamonitor 1998). It is, thus, not surprising that all food chain partakers - manufacturers, caterers and retailers alike-, are showing a growing interest in being able to supply high-quality meals that can bring more choice to the hurried consumer (Bond 1992, Larson 1998).

1.2 What are Home Meal Replacements?

The concept of Home Meal Replacements (HMR) was created in the US to designate meals that have been produced away from home for household consumption (Datamonitor 1998, Ghazala 1999). This concept, or food category, has been recently redefined in order to clarify its domain and increase its degree of consumer orientation:

- *HMR are main courses or pre-assembled main course components of a meal - a protein (animal/plant), a carbohydrate (starch) and a vegetable source -, in single or multiple portion containers, designed to fully and speedily replace the main course of a home-made main meal.*

Please cite as: Costa, A.I.A., Dekker, M., Beumer, R.R., Rombouts, F.M. & Jongen, W.M.F. (2002). A quantitative analysis of convenience-related food consumption in the Netherlands. In: *Changes at the other side of the chain: everyday consumption in a multidisciplinary perspective*. C.A.A. Butijn, J.P. Groot-Marcus, M.v.d. Linden, L.P.A. Steenbekkers & P.M.J. Terpstra (eds.), 81-89. The Netherlands: Shaker Publishing.

This concept excludes, therefore, main course components packed in non-assembled, separate containers as well as all kinds of desserts, breakfast cereals, yoghurts, candy bars, etc. Some snacks (foods usually eaten in-between main meals), starters, soups or salads can be considered as HMR as long as they respect the readiness and compositional requisites set by the definition and can be regarded by consumers as a meal's main dish (Costa et al. 2001).

1.3 Aim

The aims of this study are:

- To apply a previously developed and validated HMR classification system in the quantitative analysis of the Dutch household food consumption in 1997-98;
- To evaluate the use of the HMR classification system as a framework for the analysis of convenience-related household food consumption data.

2 Applying the HMR classification system in an analysis of convenience-related food consumption in the Netherlands

2.1 A consumer-oriented classification system for HMR: development and validation

There is an increasing diversity of production/distribution solutions offered to consumers with the aim of partially or fully replacing home-made meals. Consequently, HMR terminology is also increasingly intricate, with food chain actors mostly resorting to their own (more or less) obscure designations, like *cook-chill*, *frozen TV dinner* or *ready-to-eat*. These designations intend to reflect the various degrees of readiness for consumption of the products and the manufacturing processes behind them, but this intention is not always clear to the public authorities or to consumers. Direct results of these misunderstandings are, for instance, the difficulty of harmonising safety criteria for HMR and holding them accountable for food-borne illness incidents. It is clear that public health authorities and food scientists are in need of an unambiguous classification system for HMR. Moreover, food product developers, marketers and home economists could also greatly benefit from a clear product classification in order to be able to better analyse patterns of food consumption.

In view of the HMR definition presented, the characteristics of HMR products and existing food classification systems, several conceptual and methodological requisites should be taken into account when developing an HMR classification system. From a conceptual viewpoint, the classification should be based on criteria that are relevant for producers, distributors, researchers and consumers alike. Moreover, it should provide clear designations and a meaningful structure for HMR assortments. From a methodological viewpoint, the classification should be founded on pre-defined, precise classificatory criteria, in sufficient number to comprehensively (and yet concisely) classify all HMR currently available without ambiguities. Finally, the classification should be validated and tested for reproducibility and usability (Costa et al. 2001).

Having in mind the above-mentioned conceptual and methodological requisites, a consumer-oriented classification system for HMR has been recently developed and validated. In it, two convenience attributes are chosen as classificatory criteria - shelf-life (S_n) and the level of preparation required before consumption (C_n). For this purpose 'shelf-life' has been defined as the period within which an HMR can be kept by the consumer at home, under the recommended storage conditions, without it being rendered unfit for consumption. Taking into account the shelf-life range displayed by commercialised HMR products, four shelf-life classes have been chosen:

- $S_1 < 1.5$ weeks
- $1.5 \text{ weeks} \leq S_2 < 1.5$ months
- $1.5 \text{ months} \leq S_3 < 1.5$ years
- $S_4 \geq 1.5$ years.

Within the criterion related to the level of preparation, and based on the range of preparation activities displayed by commercialised HMR products, four classes (C1 to C4) have been defined (Table 1). This definition

explicitly encompasses the HMR regeneration process – the time/temperature couple required for bringing a HMR to a state of readiness for consumption-, which has been ‘translated’ as the consumer preparation instructions displayed in the products’ package. From C1 to C4, classes have an increasing level of time, appliances and energy inputs required before consumption. Culinary skills were kept minimal throughout the classes, except for C4, where higher cooking expertise or the addition of other ingredients may be required (Costa et al. 2001).

Table 1 – Four convenience classes for a HMR classification system (Costa et al. 2001).

CONVENIENCE CLASS	DESCRIPTION	EXAMPLES OF COMMERCIALISED PRODUCTS
<i>Ready to eat (C1)</i>	HMR consumed as purchased, requiring no prior preparation	Chilled sandwiches and salads, chilled pies, canned salads, take-away main courses and snacks
<i>Ready to heat (C2)</i>	HMR requiring only mild heating ^a before consumption (includes products processed up to a stage rendering them fit for immediate consumption after thawing or warm water addition)	Chilled pizzas and other main courses, frozen pizzas, frozen main courses and snacks or soups, dehydrated soups and spaghetti dishes, canned soups and main courses.
<i>Ready to end-cook (C3)</i>	HMR requiring sufficient heating ^b to finalise cooking before consumption.	Chilled and frozen lasagne, some frozen menus, dehydrated pasta dishes.
<i>Ready to cook (C4)</i>	HMR which have been minimally prepared for cooking (trimmed, shelled, peeled, cut, washed, etc.) but still require full cooking of some or all of its components	Frozen seafood paella, raw chilled meat/fish cuts with side dishes, raw frozen fish cut with breadcrumbs and vegetable sauce.

^a ≤15 minutes in a pan, or ≤ 20 minutes in a conventional oven/“au bain marie”, or ≤ 10 minutes in a microwave oven

^b > 15 minutes in a pan, or > 20 minutes in a conventional oven/“au bain marie”, or >10 minutes in a microwave oven

Finally, the two chosen criteria have been arranged in a four by four ‘shelf-life by preparation required’ matrix structure (S₄ x C₄). This was thought to better enable HMR classification according to these criteria since the matrix structure provided a higher level of detail by extending the number of classes from eight (the 4+4 granted by a separate criteria use) to sixteen. Finally, the HMR classification system has been validated according to methodology presented by Pearson et al. (1985). The validation procedure demonstrated that the convenience criteria chosen and its organisation in a matrix structure provide a sound and effective classification system for the universe of Home Meal Replacements considered (Costa et al. 2001).

2.2 An analysis of convenience-related food consumption in the Netherlands: methodology

In order to analyse the 1997-98 Dutch household HMR consumption using the developed classification system, we have employed the methodology developed by Pearson et al. (1985) in their study of food’s degrees of readiness for consumption. In the first stage of this procedure we have resorted to the Dutch National Food Consumption Survey 1997-98’s (DNFCS) database to obtain an HMR product list. The DNFCS database records the types of food consumed by a representative sample of the Dutch population during the surveyed period, and contains about 3100 items. More specifically, it records all the foods reported to have been eaten, either at home or outside, at least once by one of the respondents during the survey through the so-called ‘2-day food consumption diary’ method (Voedingscentrum 1999). The database does not contain, however, any information regarding the quantities of each recorded food product that have been consumed during the survey. From the

DNFCS database, and with the help of a Dutch dietician, all food products complying with the given HMR definition (174 items) were selected and its description recorded. Next, information about shelf-life and required preparation for the manufactured share of the 174 items was collected directly from the packaging of products displayed in supermarkets. In this way the information level was the same as that available to consumers. HMR products that can only be bought at a foodservice outlet and are intended for immediate consumption were given a shelf-life of one day. It was assumed that they did not require any further preparation before consumption. Finally, each item was classified according to the pre-defined criteria and assigned to its respective $S_n \times C_n$, $(n=1, \dots, 4)$ class combination within the matrix system (Costa et al 2001).

In a second research stage, the diaries recording the in-house food consumption of 2.774 Dutch households were screened for HMR consumption¹. Only 150 out of the 174 food products initially selected from the DNFCS's database as HMR could be traced back in the households' food consumption diaries. This discrepancy was due to inaccuracies existing in the database and the exclusion of some products from the HMR category after concluding that the surveyed households had not seen them as complete main courses. All the households in which one or more of these 150 HMR products was consumed during the 2 days of the survey were selected, and its HMR consumption (type of product and number of consumption occurrences) recorded. The household identification code and the demographic characteristics of the household member (s) who actually consumed the product(s) were also recorded. The number of HMR consumption occurrences that could be allocated to each of the $S_n \times C_n$, $(n=1, \dots, 4)$ class combination within the classification matrix was tallied, as well as the number of consumption occurrences per HMR product. The 150 HMR products consumed were then arranged in a descending order by the number of consumption occurrences per product. Six HMR products, which together accounted for more than 70% of the total consumption occurrences, were sorted by its position within the matrix-shaped classification system.

2.3 An analysis of convenience-related food consumption in the Netherlands: results

The outcome of the first stage of the methodological procedure described above is presented in Table 2, which shows the results of the allocation of the 174 HMR products originated from the DNFCS database within the HMR classification system (Costa et al. 2001).

Table 2 – HMR classification system displaying the allocation of the 174 HMR products selected from the DNFCS's database and the percentage of products per $C_n \times S_n$ $(n=1, \dots, 4)$ class (Costa et al. 2001).

	C1 Ready to eat	C2 Ready to heat	C3 Ready to end-cook	C4 Ready to cook
S1 Shelf-life < 1.5 weeks	32 (18 %)	2 (1 %)	0	0
S2 1.5 weeks ≤ shelf-life < 1.5 months	11 (6 %)	11 (6 %)	3 (2 %)	0
S3 1.5 months ≤ shelf-life < 1.5 years	2 (1 %)	55 (32 %)	14 (8 %)	0
S4 Shelf-life ≥ 1.5 years	0	41 (24 %)	3 (2 %)	0

The second stage of the methodological procedure yielded a total of 388 HMR consuming households, with a total of 426 HMR consumption occurrences during the DNFCS. This represents approximately 14% of the

households participating in the survey and about 1.1 HMR consumption occurrences per consuming household during the survey, respectively.

Table 3 depicts the number and percentage of HMR consumption occurrences that can be allocated to each of the $S_n \times C_n$, ($n=1, \dots, 4$) class combination within the classification matrix. Finally, Table 4 shows the six most frequently consumed types of HMR during the survey, the percentage of consumption occurrences per type of product and the types' respective classification within the matrix system.

Table 3 – HMR classification system displaying the number and percentage of HMR consumption occurrences during the DNFCS which can be allocated to each $C_n \times S_n$ ($n=1, \dots, 4$) class combination ($n=426$).

	C1	C2	C3	C4
	Ready to eat	Ready to heat	Ready to end-cook	Ready to cook
S1 Shelf-life < 1.5 weeks	140 (36 %)	19 (5 %)	0	0
S2 1.5 weeks ≤ shelf-life < 1.5 months	15 (4 %)	21 (5 %)	6 (2 %)	0
S3 1.5 months ≤ shelf-life < 1.5 years	0 (0 %)	95 (25 %)	30 (8 %)	0
S4 Shelf-life ≥ 1.5 years	0	91 (24 %)	9 (2 %)	0

Table 4 – The six most frequently consumed types of HMR during the DNFCS, the percentage of consumption occurrences per type of product and the types' respective classification within the matrix system (total number of consumption occurrences = 426). These six types of HMR together accounted for more than 70% of the total consumption occurrences during the survey.

Top 6 HMR products	Percentage of consuming occurrences	Classification
Chinese take-away meals	24 %	$S_1 \times C_1$
Frozen pizzas	17 %	$S_3 \times C_2$
Canned soups	17 %	$S_4 \times C_2$
Take-away pizzas	6 %	$S_1 \times C_1$
Chilled ethnic and Dutch ready meals	5 %	$S_1 \times C_2$
Chilled ethnic and Dutch ready meals	5 %	$S_2 \times C_2$

2.4 An analysis of convenience-related food consumption in the Netherlands: discussion

Assuming that the results of DNFCS provide a representative picture of Dutch nation-wide food consumption in the years of 1997-98, the fact that only 14% of the surveyed households reported to have consumed HMR seems to indicate a relatively low consumption of this type of products in this period. This analysis of the results is supported by the results of DNFCS itself, which show that the group of 'samengestelde gerechten' (a category of foods roughly comparable to the HMR category) was not even among the 10 most used nutritional food groups in The Netherlands in 1997-98 (Voedingscentrum 1999). However, no definite conclusions regarding this matter can be drawn, since the DNFCS was indeed limited both in time-span and number of participating households.

The results displayed in Tables 2 and 3 show that the Dutch HMR household consumption in 1997-98 was, both from a qualitative and a quantitative point of view, concentrated in two well-defined levels of convenience. These levels were, more concretely, top convenience products with minimum shelf-life ($S_1 \times C_1$), mainly sandwiches and prepared meals supplied by foodservice, and long durability convenient meals ($S_3 \times C_2/S_4 \times C_2$), mostly frozen or canned ethnic meals. Differences between the values presented in Tables 2 and 3 were only relevant (above 2%) for class combinations $S_1 \times C_1$, $S_1 \times C_2$ and $S_3 \times C_2$. These differences indicate that the importance of the consumption of top convenience products with minimum shelf-life was reinforced by the quantitative analysis, namely in what respects the consumption of HMR supplied via the foodservice and chilled ready meals. The results depicted in Table 4 show that 74% of HMR consumption occurring during the DNFCS could be accounted for by only four types of products – take-away meals (Chinese meals and pizzas - 30%), frozen pizzas (17%), canned soups (17%) and chilled ready meals (10%). All these HMR types can be allocated to classes that require none to minimal preparation before consumption (C_1 and C_2), but display a wide range of shelf-life when classified according to the shelf-life criteria (S_1 to S_4). Nevertheless, the majority of allocations respect classes S_1 , S_3 and S_4 , in agreement with the remaining results obtained.

The results of the quantitative analysis performed support previous conclusions drawn on the basis of the qualitative analysis only, already pointing out that the use of a narrow range of HMR was characteristic of the Dutch food consumption in 1997-98 (Costa et al. 2000, Costa et al. 2001). Three possible explanations for these results can be provided. The first explanation is that the results obtained are an artefact caused by the HMR classification system. This hypothesis can only be dismissed once the classification's validity with other product lists (i.e., its reproducibility) has been verified. The reproducibility of the developed HMR classification system is currently being tested and its results will be reported in the near future. The second explanation is that the concentration of Dutch HMR consumption is an artefact caused by the data sample used – the DNFCS qualitative results. This is highly unlikely since the survey was carefully designed to provide a representative picture of Dutch nation-wide food consumption in the years of 1997-98 (Voedingscentrum 1999). However, we can not completely dismiss this hypothesis since no comparable surveys were performed at the time with representative samples of the Dutch population. The last, and most likely, explanation is that indeed Dutch HMR consumption in 1997-98 was practically limited to products belonging to the two referred convenience levels, although many other products with different convenience levels were widely available at the time of the survey. This hypothesis is partially supported by ready meals' (the manufacture share of HMR) sales for The Netherlands in 1997-98, in which canned and frozen ready meals together represented over 70% of total sales volume (Datamonitor 1998). This situation could be either due to the nature of Dutch consumer preferences or the characteristics of the HMR assortment available. How much each of these causes actually contributed to such concentration in HMR consumption and ready meals' sales is a topic worthy of further investigation.

3 Conclusions and future research

The study here described demonstrates that the consumption of HMR products in Dutch households in 1997-98 was low, and concentrated in a handful of products (mostly ethnic meals) displaying a consistently high level of convenience regarding the preparation they require before consumption. The range of shelf-life exhibited by these products is somewhat wider but tends to concentrate either on products with minimum shelf-life - 35 % of the consumed products belonged to class S_1 -, or on products with long durability (34% of the consumed products in classes S_3 and S_4). However, the situation regarding HMR consumption in The Netherlands today may be different from what these results might lead to conclude. For instance, the 1998 forecasts for 1999-2001 indicated that while frozen meals would still represent half of total ready meals' sales, chilled meals would gradually surpass their canned counterparts as the second most sold ready meals in The Netherlands (Datamonitor, 1998). Nevertheless, the results here presented have, according to us, sufficiently demonstrated

that the developed HMR classification system is a valuable framework for a convenience-based analysis of household food consumption data. Moreover, we think it can be a useful tool in the analysis of convenience-related food consumption patterns based on household data.

In future research in this area we will consider the uncovering of potential relationships between Dutch household HMR consumption, as discussed in the study here presented, and consumers' socio-demographic characteristics. This research is expected to highlight areas where the introduction of new, more consumer-oriented food products and marketing strategies could bring great benefit.

4 Acknowledgements

This study has been carried out with the financial support of the Portuguese Foundation for Science and Technology, under the program PRAXIS XXI. The authors thank all the institutions involved in the 1997-98 Dutch National Food Consumption Survey for granting them with free access to the original data. The authors would also like to thank Ed Zwarts, Dr. Karen Hulshof, Saskia Meyboom and Prof. W. van Staveren for their assistance during this study.

5 Endnotes

ⁱ Each household participating in DNFC was given two different diaries to record the household members' food consumption during the two days of the survey: an individual diary for individual, out-of-the-house food consumption, and a household diary for in-house consumption of all household members (Voedingscentrum, 1999).

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