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Consumer behaviour in respect of milk in the Netherlands*

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Summary

In this paper, consumer behaviour in the Netherlands in respect of milk is investigated using a model based on the EKB model, a so-called integrated model of consumer behaviour. The objectives of the study are: to gain insight into the factors that influence buying and consumption behaviour with respect to milk and into the applicability of integrated models to consumer behaviour regarding generic products, such as liquid milk. It was established that liquid milk was perceived as a neutral drink: not ordinary or luxury, as a food not a drink for pleasure, and not as being refreshing. Liquid milk was perceived differently at varying times of consumption during the day. The most important socio-economic variables explaining individual differences in consumer beliefs regarding milk are: age, level of education, and residential area. These and other conclusions from the analysis are useful for market segmentation. The results suggest that empirical models of the EKB type can contribute to the understanding of consumer behaviour in respect of generic food products. The specific extensions of the general EKB model made in this study may be relevant for the analysis of consumer behaviour in regard to other food products.

1. Introduction

Analyses of demand for agricultural products are largely econometric and contribute much to the understanding of how global economic factors (e.g. price) influence demand for agricultural products. In particular, they serve to forecast demand for agricultural products on the basis of developments in

* For a more detailed description of this research project and the results, see Termorshuizen, 1982 (in Dutch, with summary in English).

economic variables, such as income and prices. However, for the appropriate marketing of agricultural products, a more thorough understanding of consumer behaviour is necessary. Especially advertising and product policy require greater knowledge of the factors determining consumer food choice behaviour. Numerous analyses of aspects of consumer behaviour in respect of liquid milk have been carried out. However, many of these studies have been commissioned by private companies and related commercial bodies and are therefore confidential. Of the very few which have been published, the following are cited. Dichter (1964) carried out a psycho-analytical study of motivation towards milk consumption. Beldo (1966) demonstrated the value of consumer evaluation criteria with regard to milk for market segmentation. Bayton (1963) quoted a study sponsored by the American Dairy Association which revealed a set of six basic factors operating in the perception of milk: I. Vitality; Strength; II. Body Building Growth; III. Personableness; IV. Beverage Use; V. Age of User, and VI. Health Apprehension. Ackerman *et al.* (1981) analysed aspects of consumer behaviour with regard to milk consumption in Belgium. In the United States consumer responsiveness to milk advertising has been analysed extensively (e.g. Kinnucan and Forker, 1982; and Thomson and Eiler, 1977).

Analyses of consumer behaviour tend to be partial, for example, dealing with psychological or sociological aspects only. This is also true for analyses of consumer behaviour in respect of agricultural products. However, for marketing purposes, these approaches need to be integrated. Various models for integrated analyses of consumer behaviour have been developed in marketing theory. Well-known are those developed by Nicosia (1966), Howard and Sheth (1969), Engel and Blackwell (1982), and Bettman (1979). These models are difficult to apply in empirical studies because of the many variables included which are hard to measure. This may be the reason why such models have not been applied to date in the analysis of demand for agricultural products. In the present study an integrated model has been developed to describe consumer behaviour in respect of milk. Our model follows the framework of the so-called EKB-model, originally developed by Engel, Kollat and Blackwell (Engel and Blackwell, 1982). To the authors' knowledge, this is the first time that liquid milk consumption has been analysed with such an integrated model. In this paper, the EKB model is first reviewed briefly, and subsequently, a model for the consumption of liquid milk based on the EKB model is presented. Then estimation procedures and results are discussed. From the results, conclusions can be drawn about consumer behaviour in respect of liquid milk. In addition, the results give an insight into the value of integrated models of consumer behaviour regarding perishable agricultural products.

2. Integrated models of consumer behaviour

During the 1960s, efforts to develop integrated models of consumer choice behaviour were initiated. Classic examples of that work are the models of Nicosia

(1966) and Howard and Sheth (1969). According to Engel and Blackwell (1982: 678), workable models 'should delineate:

- (1) the variables associated with consumer decision processes;
- (2) the general relations that exist among variables; and
- (3) the general principles that express the model's ingression in particular purchase occasions'.

The integrated model of consumer behaviour of Engel, Kollat and Blackwell (EKB model) is discussed in detail because it served as a frame of reference for the development of a consumer behaviour model for milk consumption. This model was chosen because it offered a broad framework of consumer behaviour and because it integrated most factors which have been demonstrated, or are assumed to be relevant, to consumer behaviour theory. The model emphasizes the choice to be made from a set of alternatives, for example, the choice of milk from all beverages which are choice alternatives on a certain consumption occasion. In the EKB model, decision-making behaviour of consumers is assumed to comprise four stages: problem recognition; search; alternative evaluation; and choice.

The EKB definition of problem recognition is 'a perceived difference between the ideal state of affairs and the actual situation, sufficient to arouse and activate the decision process' (Engel and Blackwell, 1982). Problem recognition can be activated either by external stimuli (e.g. talking about a particular product) or by internal stimuli (e.g. thirst).

Once a problem is recognized, alternative solutions are sought. First, an internal search is carried out, and if one alternative is strongly preferred then a decision is taken immediately. This method of problem solving is known as routinized response behaviour. However, if the internal search does not provide sufficient information, an external search process begins as is the case: (a) in limited problem-solving behaviour, where a consumer is aware of the choice criteria but not of the performance on such criteria of all the alternatives available in the market, and (b) in extended problem-solving behaviour, that is a decision situation in which the consumer is unaware of the choice criteria or of the performance of the alternatives on these criteria. The acquired information is processed by the consumer and stored in his memory.

The outcome of the search stage is a number of alternatives for selection by the consumer. In the following stage, in the decision process, the alternatives are evaluated. This includes selecting and weighing evaluative criteria, developing beliefs, and combining them into attitudes. In the case of a beverage, the evaluative criteria may include, 'refreshing', 'healthy', and 'nutritious'. In the model presented, products are considered to be multidimensional. Beliefs link the evaluative criteria to the alternative drinks, from which a choice is to be made, for example, 'milk is wholesome'. In the EKB model, a modification of the attitude model developed by Ajzen and Fishbein (1973) is used. This model is described by the equation

$$AT_j = \sum_{k=1}^K B_{jk} w_k \quad (1)$$

where

AT_j = attitude towards alternative j ;

B_{jk} = belief, linking evaluative criterion k to alternative j ;

w_k = subjective importance of evaluative criterion k .

In the final stage of the decision-making process one particular alternative is chosen. However, another variable may intervene between attitude formation and choice, that is, behavioural intention. In this variable, the impact of attitude and of social influences on behaviour are integrated. Social influences are assumed to be determined by normative beliefs ('I am supposed to behave in this way') and motivation to comply ('In general, I do what others expect me to do'). Choice is assumed to be consistent with the behavioural intention, unless unanticipated circumstances occur at the time of choice (e.g. the product is out of stock).

The outcome of the consumer decision process can be either satisfaction, if the choice made is consistent with beliefs and attitudes, or dissatisfaction, which may lead to post-decision search for information to reduce that dissatisfaction.

From their model, Engel and Blackwell derived further specific models including a model for 'low involvement' buying behaviour. The general EKB model has been used as a frame of reference for the model presented in this paper, and has been modified on the basis of the particular characteristics of the consumption of liquid milk and the data available.

Our model, described in the next section, has the same basic structure as the EKB-model. The purpose of using this model is to get a better insight into the factors determining consumer choice with respect to milk, i.e. the purpose is to *explain*. The model helps to structure the consumer decision process. It should be stressed however that the purpose is not to test the EKB-model. It may be questioned whether such a general model could be tested at all. For a more specified model, the Howard and Sheth model, efforts have been undertaken to test the model. The results of these tests varied widely (see for instance Engel and Blackwell, 1982).

Another point to be mentioned here is our purpose to explain choice with respect to the *consumption* of milk versus other beverages. It is assumed that these beverages are available in the household already. Our model does not directly explain *purchases* of milk although, of course, purchase behaviour is closely linked to consumption behaviour.

3. A model of consumer behaviour in respect of milk

The decision-making process in respect of milk has been conceived as a choice of beverage. This choice was investigated within the context of home consump-

tion only, and consumption in other places, such as in restaurants and at school, was not included. Consequently, consumer behaviour has been analysed as a choice process between 12 frequently consumed beverages: whole milk, semi-skimmed milk, buttermilk, whole yoghurt, skimmed yoghurt, fruit yoghurt drink, chocolate milk, coffee, tea, fruit juice, soft drinks and beer, thus implying that not only milk but also other beverages should be included in the analysis.

In this section, a consumer decision model is developed specifying the variables, and the equations describing the relationship between these variables, in each of the four stages of the decision process. The model is presented schematically in Figure 1 on page 10. The operationalization of variables in the model in this study is also discussed in this section.

3.1 Problem recognition

In the choice of a beverage, problem recognition can be, for instance, a feeling of hunger or thirst, or a need to act socially. Clearly these are different types of problems. It is assumed that problem recognition differs at various times during the day. For instance, drinking coffee in the evening can be result from a need to act socially, whereas soft drinks in the afternoon can be motivated by thirst. Consequently, the decision-making process with regard to milk is assumed to vary at different times during the day.

This process has been investigated separately for breakfast, lunch, afternoon, and evening. Problem recognition as such has not been analysed, because the products under investigation are purchased frequently and are well-known to consumers.

3.2 Search

It is assumed that the decision-making process is a limited problem-solving process. This implies that consumers are aware of the criteria on which to evaluate the alternative beverages, but are not as yet aware of the performance of each alternative in a particular situation (Howard, 1977). For some respondents, the model of routinized response behaviour may be more appropriate because this is a limited problem-solving model in which there is but one alternative.

The set of alternatives can differ for each individual. For the purpose of including the most likely alternatives to milk, the set of 12 frequently consumed beverages was chosen. This set was the same for all respondents.

Consistent with limited problem-solving, active search is assumed to be of little importance in this frequent decision process. Stored information and experience are the main guidelines in making such a choice. Some active search occurs when a new beverage is presented. The consumer may sample the new beverage and this newly acquired information is stored in his memory.

3.3 *Evaluation of the alternatives*

In evaluating the alternatives, the consumer uses criteria of relevance to him. He has his beliefs about the alternatives; such beliefs with regard to beverages, according to the EKB model, are a function of norms and values, life style, and personality. The same holds for the consumer's subjective weighing of the criteria. Within the constraints of the survey, it was impossible to include all these variables adequately. In particular, life style and personality would have required too much interviewing time. Also it is well known that past research on personality as an explanatory variable of consumer behaviour has not provided many reliable results (see for instance: Engel and Blackwell, 1982). Apart from these deviations from the EKB model because of measurement problems, equations (2) and (3) also differ from the EKB model because of the inclusion of some specific variables, which are supposed to explain beliefs and weights with respect to liquid milk consumption.

Consequently, equations (2) and (3) are based on the EKB model as a frame of reference but include as well some explanatory variables which are specific with respect to drinks. Amongst others, purchasing and consumption habits seem important in this respect: heavy users may have different salient beliefs and weights than light users. Also regional differences in culture, specifically in consumption habits, may influence beliefs and weights. Social class, level of education and regional district probably seem to be related to values and norms of consumers and to life style. Life style may be related to family size too.

Therefore, a broad range of demographic and socio-economic variables and consumption variables are proposed to be explanatory variables of beliefs and weights with respect to liquid milk consumption.

As a result, the first two equations of the model are:

$$B_{ijk} = f_{jk}(A_i, HS_i, SC_i, D_i, ED_i, PH_i, CH_i) \quad (2)$$

$$W_{ikt} = g_{kt}(A_i, HS_i, SC_i, D_i, ED_i, PH_i, CH_i) \quad (3)$$

where

- B_{ijk} = belief of individual i , linking evaluative criterion k to beverage j
- W_{ikt} = subjective importance to individual i of evaluative criterion k at time t of the day.
- A_i = age of individual i
- HS_i = size of household to which individual i belongs
- SC_i = social class of the household to which individual i belongs
- D_i = regional district in which individual i lives
- ED_i = level of education of individual i
- PH_i = purchasing habits of individual i : whether he purchases milk from the milkman, and frequency of milk purchasing
- CH_i = consumption habits of individual i : never purchases milk; consumed milk at school; prefers pasteurized milk.

Attitudes are expressed in an expectancy-value structure (Wilkie and Pessemier, 1973) as

$$AT_{ijt} = \sum_{k=1}^K B_{ijk} \cdot W_{ikt} \quad (4)$$

where

AT_{ijt} = attitude of individual i drinking beverage j at time t of the day

K = the number of evaluative criteria.

From a pilot study, seven attributes were derived as being of relevance to consumers in choosing a beverage to drink at a particular time of the day: wholesome, ordinary, refreshing, tasty, social, cheap, and preventing heart and coronary diseases. These attributes are generally consistent with the perceptual dimensions of milk inferred by Bayton (1963) and Ackerman *et al.* (1981).

Beliefs were rated on a five-point scale for statements, such as, 'whole milk is very/rather/somewhat/a little/not at all wholesome'. Respondents were asked to rate all 12 beverages in the study on all seven evaluative criteria.

The subjective weights for each criteria which were assumed to differ with time of consumption were measured by a 70-point constant sum scale. Respondents were asked to divide the 70 points among the seven criteria according to the importance they attached to each criteria when choosing a beverage at a particular time of day.

3.4 Behavioural intention

In the EKB model, behavioural intention is determined by attitudes to the alternatives, social influences and anticipated circumstances. The first two variables are in accordance with the Fishbein Extended Model (Ajzen and Fishbein, 1973). The social influences represent both the pressure consumers perceive from reference groups to behave in a certain way and the extent to which consumers concede to that pressure. The social norm is defined as

$$SN_{ij} = \sum_{m=1}^M NB_{imj} \cdot MC_{im} \quad (5)$$

where

SN_{ij} = overall social norm of individual i regarding drinking alternative j

NB_{imj} = belief of individual i about reference group m regarding drinking alternative j

MC_{im} = motivation of individual i to comply with reference group m

M = the number of reference groups.

Social influences as defined in equation 5 are limited to the reference groups:

the household, parents, physicians, and friends; these groups emerged as being important in a pilot study. To measure normative beliefs, a yes-no scale was used for each combination of a reference group and a drink (e.g. 'my parents have not taught me to drink . . .').

Motivation to comply was measured using a five point scale for each reference group (e.g. 'in drinking behaviour, I generally do what my parents have taught me'). The influence of others in the family is represented by the attitude of another individual in the same household.

Equations (4) and (5) are definitional equations. They express how, in the Fishbein-model, attitudes and social norms are specified as a multidimensional concept. Consequently, these equations will not be tested in this research.

It has been argued already in Section 2 that it may be useful to introduce behavioural intention in the model between the elements 'alternative evaluation' and 'choice'. In the case of milk, it does not seem that positive evaluation necessarily implies positive consuming intention. Norms with respect to the consumption of the product and normative compliance seem of importance as well in this respect. Consequently equations (5) and (6) are proposed as useful elements of our model. They are according to the Fishbein Behavioural Intentions Model. Behavioural intention was measured by asking respondents to rank the 12 beverages in order of preference. For that purpose, respondents were asked to imagine that within a few days they would wish to take a drink at a certain time of the day, and to rank the 12 beverages in order of preference. The behavioural intention regarding a particular drink is specified as follows

$$BI_{ijt} = h(AT_{ijt}, SN_{ij}, AT_{ajt}, AC_{it}) \quad (6)$$

where

BI_{ijt} = behavioural intention of individual i in respect of drink j for time t of the day.

AT_{ijt}, AT_{ajt} = attitude of individual i and of individual a in the household to drinking alternative j at time t of the day.

AC_{it} = anticipated circumstances by individual i at time t of the day.

SN_{ij} = overall social norms of individual i regarding drinking alternative j .

Equation 6 was estimated separately for each alternative j .

3.5 Choice

In general, the alternative chosen will be that with the highest behavioural intention. However, unexpected circumstances may arise at the time of choice; mainly the unavailability of the chosen alternative. As out-of-stock problems occur rarely in the case of milk, unexpected circumstances do not seem to be of great importance for drinking milk at home. Clearly, in a buying situation,

other unexpected circumstances may occur, such as, a sudden change in price, a change in income, or the particular product being out of stock.

Consequently, in accordance with the EKB model, choice of milk is assumed to be a function of behavioural intention and of unexpected circumstances:

$$C_{ijt} = k(BI_{ijt}, UC_t) \quad (7)$$

where

C_{ijt} = choice of individual i of a beverage j at time t of the day

BI_{ijt} = behavioural intention of individual i in respect of beverage j at time t of the day

UC_t = unexpected circumstances at time t of the day.

As a measure for actual choice, frequency of drinking a beverage at a certain time of the day was used. This measure was preferable to asking respondents to state the quantity consumed during the week before the interview, for instance, because of the risk of overestimating the amount consumed.

Unexpected circumstances were measured as the frequency that milk was not available when that was the required drink.

3.6 Summary of the model and data collection

The model of consumer behaviour in respect of milk, as represented by the equations 2 to 7, is shown as a flow-chart in Figure 1.

Data on the variables in the model were collected from a representative sample of 998 Dutch households, all the housewives of which were interviewed. In addition, in each household, another person over 15 years of age was selected to answer questions on attitude in order to measure the variable AT_{ajt} . Four versions of the questionnaire were used, one for each of four times during the day (breakfast, lunch, afternoon, and evening). Consequently, the sample size per questionnaire for each time was a quarter of the whole sample.

4. Results

The equations describing the model have been estimated by various methods applicable for the respective equation. The evaluative criteria were validated prior to estimation.

4.1 Validation of the evaluative criteria

A fundamental condition for the successful application of the model is the validity of the evaluative criteria used in the analysis. For this reason the seven criteria found in the pilot study were first validated using multidimensional scaling. The respondents were asked to rate the subjective similarity of each pair

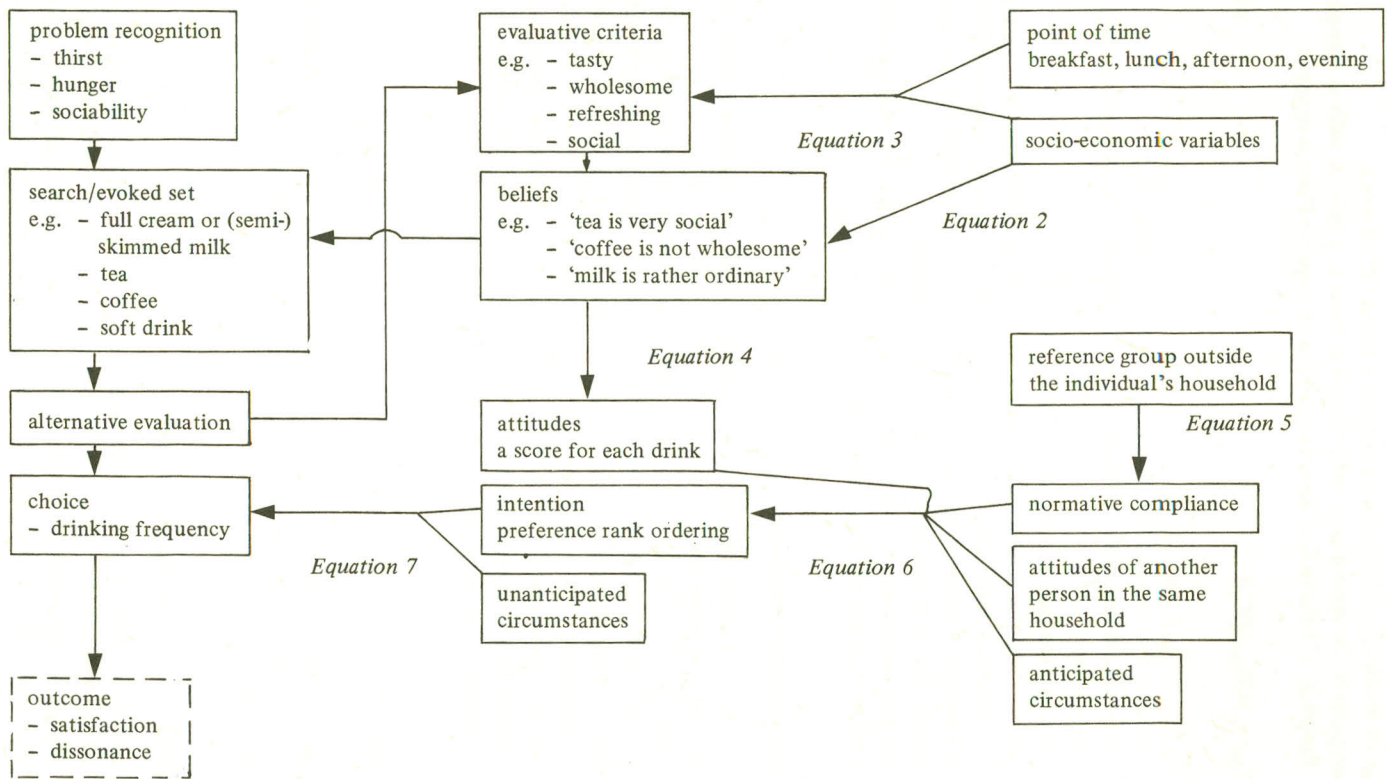


Figure 1. A model of consumer behaviour in respect of milk

of beverages on a five-point scale. The scores were analysed using Kruskal and Carmone (1969) MDScal-algorithm. With this algorithm, a perceptual configuration of the 12 beverages was developed in which beverages perceived as being very similar are close together and those perceived as dissimilar are at a distance from each other. The solution (stress: .045) obtained in a three-dimensional configuration of the 12 beverages (Figure 2) was such that the seven attributes originally found to be important for milk, may be condensed into three basic perceptual dimensions.

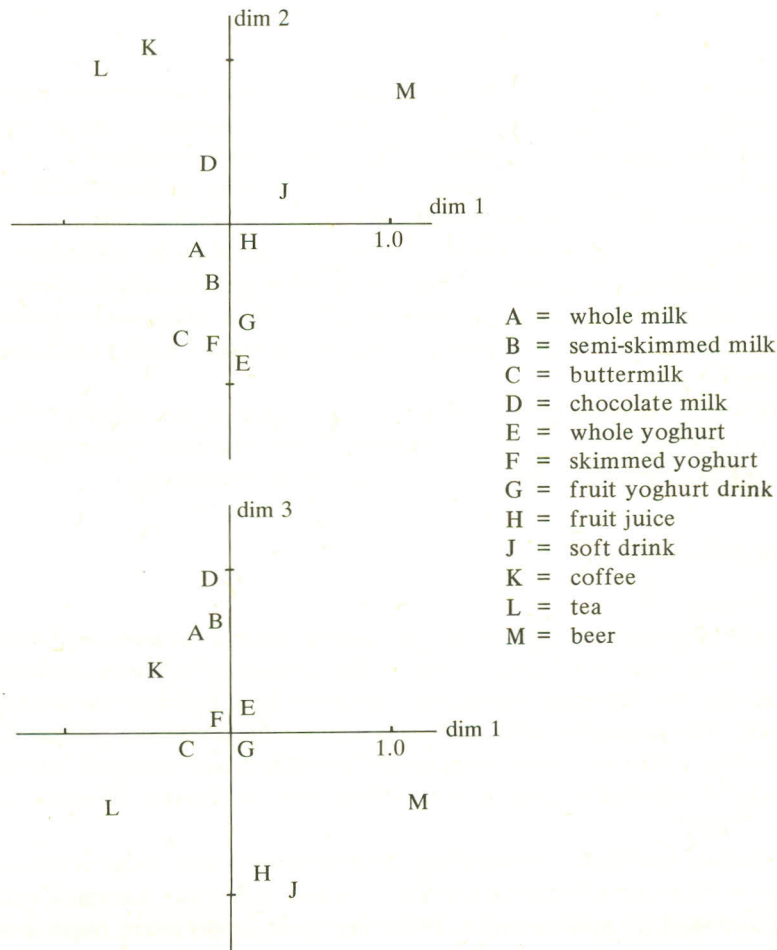


Figure 2. *Perceptual configuration of 12 beverages in three dimensions*

For the interpretation of the three dimensions, consideration was given to rank correlations of the mean scores of the beverages on the seven attributes and the scores of the beverages on the perceptual dimensions.

Table 1. *Rank correlations showing the relationships between attributes and perceptual dimensions*

Dimension	Attribute						
	Wholesome	Ordinary	Refreshing	Cheap	Not bad for heart	Tasty	Social
1	-.26	-.87**	.04	-.53*	-.17	-.52**	-.06
2	-.69**	.11	-.15	-.30	-.59**	.11	.83**
3	.28	.27	-.69**	.15	-.13	.02	-.31

* $p < .05$; ** $p < .01$

Dimension 1 (Figure 2) correlated negatively with the attributes ordinary, cheap, and tasty. This dimension indicates whether a beverage is seen as either ordinary (coffee and tea, for example), or as a luxury (beer, for example).

Dimension 2 (Figure 2) correlated positively with the attribute social and negatively with the two health attributes. Beverages rated high on this dimension (coffee, tea, beer, for example), are perceived as being taken for social and not for health purposes. It is possible that certain beverages are seldom taken for pleasure, but solely for their healthfulness as a food. Thus, the second dimension indicates whether a beverage is seen as being utilitarian (as a food) or hedonistic (for pleasure).

Dimension 3 indicates the extent to which a beverage is seen as being refreshing. Chocolate milk, whole milk, and semi-skimmed milk were not so regarded, whilst fruit juice and soft drinks were perceived as very refreshing.

4.2 *Model estimation*

Beliefs (equation 2)

The relationship between beliefs and the socio-economic variables was investigated by canonical correlation in view of the numerous beliefs as dependent variables and the numerous explanatory variables. Each beverage was analysed separately. The results for whole milk and semi-skimmed milk are presented in Table 2. For a full description of canonical correlation as a statistical method, the reader is referred to statistical textbooks (see for instance Chatfield and Collins, 1980).

In general, few strong relationships between beliefs and social and demographic variables were found. In the case of whole milk, three canonical correlations were highly significant ($p < .005$). The three factors relate, respectively, to the extent to which whole milk is considered a cheap product ($r_c = .35$); the taste of whole milk ($r_c = .30$); and to health attributes ($r_c = .26$). Respondents having a high level of education and those who preferred pasteurized as opposed to sterilized milk, considered whole milk to be cheap. Those respondents not purchasing milk at all did not like its taste; this variable did not load significantly on the two other factors. Housewives between 50 and 65 years of age were not

Table 2. *Canonical correlations showing the relationship between beliefs with respect to milk and socio-economic variables*

	Whole milk			Semi-skimmed milk
Number of respondents	869	869	869	860
Canonical correlation	.35	.30	.26	.35
Attributes:				
healthy			-.66	.51
luxurious		.31	.32	-.49
refreshing		-.72	-.63	.45
cheap	-.56			.48
not bad for heart			-.71	.41
tasty		-.74		.59
social	.47	-.48		
Percentage of variance explained	11	20	21	22
Age of housewife (years):				
15-24				
25-29	-.36		-.32	
30-34				
35-39			-.41	
40-49				
50-64			.53	
Household size				
Doorstep delivery				-.37
Never purchase milk		.47		
Social class:				
A				
B1				
B2				.34
D	.37			-.41
Geographical area:				
Rotterdam/Amsterdam/Den Haag				
West	-.36			
North	.33	-.43		
East			-.44	
Educational level:				
low		-.36	-.30	
middle				.31
high	-.52	.32		.50
Had school milk			-.34	
Preference for pasteurized milk	-.47	-.47		
Milk-buying frequency		-.37		

convinced of the health value of whole milk to the same extent as those in other age groups. Fear of cardiovascular disease may play a role in that; those in this age group may feel the need to reduce their intake of fat.

Subjective weights (equation 3)

The results obtained with equation 3 have been analysed by a multiple regression analysis. Prior to the analysis, the hypothesis that the weights of the seven attributes differed with time of consumption, was tested by analysis of variance. The mean weight for each attribute on a 70-point scale is given in Table 3.

For four of the seven attributes, mean weights differed significantly with the time of consumption. At breakfast and lunch, the health attributes were more important, while in contrast the attributes, social and refreshing, were relatively unimportant. In general, health attributes and the attributes taste and social, were found to be the most important in the choice of a beverage at a specific time.

In regression analyses both for all attributes and for the four times of consumption, 7% to 20% of the variance in attribute weights was explained. As in the results obtained by the analysis of equation 2, the most important explanatory variables were age and level of education of the respondent, and geographic area of residence. These variables may be related to habits and changes in habits; a high level of education may well lead to a more critical view of habits and change in habits.

It is well known that analysis of consumer behaviour on the basis of data of individual households is impeded by differences in consumption between individual households which are not caused by systematic factors. However, the statistical fit in our research is in line with R^2 -values found in other work, (for instance Bass and Wilkie, 1973; Bonfield, 1974; Ryan and Bonfield, 1975; Bhagat *et al.*, 1979).

Attitudes and social norms (equations 4 and 5)

Attitude scores were not estimated but were determined by the expression given as equation 4. They were derived by multiplying weights by beliefs. The mean attitude scores calculated on the basis of normalized beliefs are given in Table 4.

For all beverages except chocolate milk, fruit juice, and tea, attitude scores differed significantly with the time of the day. These differences can be explained in terms of the differences in the scores of beliefs and of weights.

It also appeared that fruit juices were given the highest attitude score at four times during the day, both by housewives and other members of the family. Household life cycle seemed to influence attitudes. For instance, housewives between 18 and 40 years of age, had a more positive attitude to liquid milk at breakfast and at lunch. This may be related to the responsibility for the feeding of growing children in that stage of the household life cycle. It is interesting to note that consumer attitude was stronger for tea than for coffee in the evenings; yet coffee, and not tea, is the traditional drink in the Netherlands. This higher attitude score for tea is based on the higher scores for tea on the

Table 3. Mean weights on a 70-point scale for attributes of milk consumed at various times during the day

Attribute	Wholesome	Ordinary	Refreshing	Cheap	Not bad for heart	Tasty	Social	Total
Breakfast	23.4	2.9	6.2	4.4	11.9	13.9	7.3	70
Lunch	25.7	2.9	7.3	4.0	12.2	11.7	6.2	70
Afternoon	18.1	3.3	9.3	4.1	9.9	13.5	11.7	70
Evening	16.9	3.0	8.6	3.2	9.9	13.5	15.0	70
ANOVA: $p =$.00	.77	.00	.16	.03	.22	.00	
Overall mean	21.1	3.0	7.8	3.9	11.0	13.2	10.0	70

Table 4. *Mean attitude scores of housewives for beverages consumed at various times during the day*

	Breakfast (n=233)	Lunch (n=217)	Afternoon (n=202)	Evening (n=216)	ANOVA: p =
Whole milk	5.99	6.20 ^b	5.68	5.69	.00
Semi-skimmed milk	6.36	6.41 ^a	6.11	5.96	.00
Buttermilk	6.93	6.97	6.67	6.27	.00
Chocolate milk	5.31	5.12	5.18	5.23	.46
Whole yoghurt	5.94 ^a	5.98	5.69 ^a	5.57 ^a	.00
Skimmed yoghurt	6.27 ^b	6.49 ^{a,b}	6.09 ^b	6.09 ^b	.04
Fruit yoghurt drink	5.68	5.63	5.37	5.35	.02
Fruit juice	7.14	6.97	7.11	7.23	.22
Soft drink	4.63	4.67	5.08	5.08	.00
Coffee	5.24	5.07	5.86 ^{a,b}	6.06 ^b	.00
Tea	6.52 ^b	6.55 ^b	6.63	6.81	.24
Beer	3.98	4.05	4.51	4.65	.00

^a Differs from the score of whole milk ($p < .05$)

^b Differs from the score of semi-skimmed milk ($p < .05$)

attributes 'not bad for the heart' 'cheap' and 'refreshing'. Coffee was chosen as being only slightly superior to tea on the attribute 'tasty', but substantially so on the attribute 'pleasant'. Possibly in the evening, the decision process in choosing a drink is of the lexicographic type: those drinks considered superior in the attributes 'tasty' and 'pleasant' were chosen.

As may be expected, the male members of the households tended to have a more positive attitude towards beer than housewives. Scores for whole milk were high on attributes relating to health but low on the social attribute. The weights for these attributes were also high and low respectively for breakfast and lunch, however, the opposite held for these weights during the afternoon and evening. Thus the mean attitude score for whole milk was high at breakfast and lunch and relatively low during the afternoon and evening. This confirms the role of milk as a basic food and not as a social drink.

In equation 5, social norms of individuals in respect of consumption of a drink are defined as the product of normative beliefs and motivation to comply. Consequently, the determination of social norms does not require further comment. They were not differentiated as to the time of consumption.

Behavioural intention (equation 6)

Behavioural intention may be estimated with equation 6 in two ways, namely, separately for each respondent, or separately for each beverage. When interpreting the results, it should be kept in mind that behavioural intention was measured

by ranking in order 12 beverages. Using only ordinal data on intention, the levels of significance should be considered with caution.

(a) *Analysis per respondent for each beverage*

For each responding household in which the housewife and a second person were interviewed, regression coefficients of AT_{ijt} , AT_{ajt} and SN_{ij} were estimated. In equation 6, positive coefficients were expected for AT_{ijt} and SN_{ij} but the coefficient for AT_{ajt} could be negative, zero, or positive. The extent to which the results are in accordance with this hypothesis is shown in Table 5.

Table 5. *Percentage of significant ($p < .10$) regression coefficients in $BI_{ijt} = a + b AT_{ijt} + c SN_{ij} + d AT_{ajt}$, estimated separately for each household (AT_{ijt} = attitude of i to drinking j at t ; SN_{ij} = social norms of i regarding drinking j ; AT_{ajt} = attitude of a to drinking j at t , BI_{ijt} = behavioural intention of i to drinking j at t .)*

Variable	AT_{ijt}	SN_{ij}	AT_{ajt}	AT_{ajt}	$n (=100\%)$
Sign of coefficient	pos.	pos.	pos.	neg.	
Breakfast	28	28	4	6	127
Lunch	30	19	2	7	104
Afternoon	31	19	7	6	114
Evening	33	11	13	6	113

The variance of behavioural intention, explained by the explanatory variables in equation 6, differed significantly ($p < .05$) from zero for one of three respondents, implying $R^2 = .60$ or more. The median R^2 is about .50 for each of the four periods of consumption. This is in accordance with the findings of Lehmann (1971) and Nakanishi and Bettman (1974). A significant relationship was found between the respondent's attitude (AT_{ijt}) and behavioural intention in about 30% of respondents.

The attitudes of other members of the household did not have a strong effect on buying intention of housewives. Coefficients of AT_{ajt} differed significantly from zero for 9% to 19% of respondents, and, approximately as many cases were positive as were negative. The attitude of other family members seemed to have a stronger influence on behavioural intention in the evening than at other times of the day; in particular, in the evening, the housewife served what other members of the family preferred.

The coefficient of social norms, SN_{ij} , was, for 11% to 28% of the respondents, significantly positive. Social norms, (parents, doctors and friends) seemed to be of more importance for the consumption of liquid milk at breakfast than at other times of the day.

(b) *Analysis per beverage in a cross-section of respondents*

Behavioural intention was estimated with equation 6 separately per beverage. In this approach, the dependent variable BI_{ijt} is the rank order of beverage j by individual i at time t of the day. Thus the number of observations of BI_{ijt} is equal to the number of persons. The estimated regression coefficients are given in Table 6. The respondent's own attitude (AT_{ijt}) was, in 44 of 48 analyses, significantly ($p < .05$) related to behavioural intention. The other independent variables (SN_{ij} and AT_{ajt}) were not of importance in many cases. In general, only a small part (4% to 34%) of behavioural intention variance is explained.

From Table 6 it may be concluded that for the consumption of milk, coffee, soft drinks, and skimmed yoghurt, social influences were of importance at different times of the day. The influence of others in the same household tended to have a greater effect on the choice of beverage in the evenings than at other times.

Choice (equation 7)

The unexpected circumstance, the chosen beverage is not available, seemed to be practically non-existent. This is in accordance with the assumption that the investigated decision process occurs frequently.

In general, a significant positive relationship was found between behavioural intention and drinking frequency. The mean rank correlation coefficient between both variables was 0.52 at breakfast; 0.51 at lunch; 0.56 during the afternoon; and 0.57 during the evening.

As a substitute for equation 7, drinking frequency was directly related to the variables that are supposed to explain behaviour intention in equation 6; that is attitudes and social norms. This was done in order to assess the importance of the behavioural intention in the equation to explain actual choices (variables have been defined earlier).

$$C_{ijt} = a + bAT_{ijt} + cSN_{ij} + dAT_{ajt} \quad (8)$$

Drinking frequency of whole milk and skimmed milk at breakfast and at lunch was explained by this equation better than by equation 7. The explanation of drinking frequency of milk did not seem to be improved by introducing behavioural intention between attitude and consumption, as expressed in drinking frequency. This, again, is consistent with the almost non-existence of unexpected circumstances in this frequent decision process.

5. Discussion and conclusions

Integrative models of consumer behaviour, for example the EKB model, are generally intended for the explanation of consumer behaviour in the choice of a particular product brand. The central position of these models in the theory of consumer behaviour justifies an analysis of their applicability to consumer behaviour regarding generic products, such as liquid milk. This study investigated the extent to which the EKB model may be used in the analysis of household

consumer behaviour of milk. To the authors' knowledge, models of this type have not been used for that purpose previously.

Employing the EKB model as a frame of reference, six equations were developed to describe the choice of liquid milk from a list of 12 beverages, which included liquid milk. Data were collected by a representative national survey ($n = 998$). The following conclusions have been drawn on the basis of the results of the estimation.

From a pilot study, consumers were found to distinguish seven attributes in milk and other beverages: wholesome, ordinary, refreshing, cheap, not bad for the heart, tasty, and social. It was established by the main survey that all seven attributes were related to three basic perceptual dimensions: ordinary/luxury; utilitarian/hedonistic; and refreshing/not refreshing. Liquid milk was perceived as a neutral drink: not ordinary or luxury; somewhat utilitarian, that is to say a food, not a drink for pleasure, and not refreshing. Liquid milk was perceived differently at varying times of consumption during the day. The mean attribute weights for four of the seven attributes differed significantly at different times of consumption. At mealtimes, health attributes tended to receive more attention, while in the evening the social character of a beverage was more important.

The most important socio-economic variables, used as proxies for variables, such as, norms, values, and life style in explaining individual differences in consumer beliefs regarding milk were: age, level of education, and residential area. Some influence of reference groups, parents, doctors, and friends, and of other household members on the behavioural intention of the decision-maker could be established. The influence of other household members was strongest in the evening.

Conclusions from the analysis are useful for the development of a marketing strategy in respect of liquid milk, and a part of such a strategy could be market segmentation. According to the results, consumers of whole milk could be described as having a preference for milk: they did not consider price to be important in choosing a drink; and for health reasons they might reduce their consumption of whole milk, but, because of the taste difference, they did not substitute semi-skimmed milk for whole milk. Those consuming semi-skimmed milk were more health conscious and price was also of greater importance to this group than to others.

The following observations are made about the method of analysis. The results suggest that empirical models of the EKB type can contribute to the understanding of consumer behaviour in respect of generic food products. The main contribution of this model, as compared with traditional econometric approaches, is that it offers a systematic framework for the analysis of the role of psychological and sociological factors in consumer choice of food products.

The specific extensions of the general EKB model made in this study may be relevant for the analysis of consumer behaviour in regard to other food products. For example, it was established that attitudes of other household members represent significant explanatory variables for buying intentions of consumers.

Table 6. Regression coefficients^a and adjusted R^2 in regression analyses per beverage in equation 6, $BI_{ijt} = a + bAT_{ijt} + cSN_{ij} + dAT_{ajt}$, for a cross section over households

	Breakfast (n=130)					Lunch (n=106)				
	R^2	AT_{ijt}	SN_{ij}	AT_{ajt}	Const.	R^2	AT_{ijt}	SN_{ij}	AT_{ajt}	Const.
Whole milk	.14	.4672*	.1382*	.1628	2.7880	.31	1.0988*	.0995	-0.0265	0.08834
Semi-skimmed milk	.31	1.0014*	.0345	.2515	-0.4062	.30	1.0442*	.1666*	.2161	-1.2214
Buttermilk	.04	.4762*	.0886	0.1508	4.0459	.33	1.1594*	.1228	.2703	-2.7460
Chocolate milk	.05	.4296*	-0.0080	.2060	3.3065	.10	.7703*	.0844	-0.1213	3.2585
Whole yoghurt	.06	.3424*	.0328	.0465	2.7202	.23	.6100*	.1159*	.0812	.3889
Skimmed yoghurt	.24	.8928*	.1397*	-0.0888	-0.6137	.13	.6609*	.0755	.0543	.4378
Fruit yoghurt drink	.10	.4352*	-0.0625	.3660*	1.6019	.16	.7088*	.0282	.1718	.8712
Fruit juice	.16	.9605*	.0857	-0.0033	-0.1198	.08	.6358*	.0456	.1460	.4292
Soft drink	.06	.2812†	.0963†	.0978	1.4881	.16	.7783*	-0.0206	-0.0931	.9956
Coffee	.08	.4001*	.1090*	-0.0162	6.6345	.13	.4895*	-0.0414	.3925	4.4645
Tea	.11	.4381*	-0.0059	-0.0742	8.6407	.23	.9778*	.0378	.1016	2.2603
Beer	.09	.1396*	.0128	.0019	.5677	.16	.3263*	-0.0546	.1150	-3.1418

(Table 6 continued)

	Afternoon (n=115)					Evening (n=113)				
	R ²	AT _{ijt}	SN _{ij}	AT _{ajt}	Const.	R ²	AT _{ijt}	SN _{ij}	AT _{ajt}	Const.
Whole milk	.15	.5840*	.0188	.3226	.5909	.18	.8463*	.0612	.1260	.0843
Semi-skimmed milk	.16	.8635*	.1062	-0.1832	.8332	.34	.9516*	.1633*	.3379*	-3.1576
Buttermilk	.27	.7732*	.2163*	.3400*	-1.4691	.23	.6709*	.2472*	.1945	-1.0963
Chocolate milk	.14	.6779*	.0473	.2603	.6039	.10	.5616*	.0719	.1961	1.7828
Whole yoghurt	.04	.3037*	.0559	.0591	2.5969	.06	.4743*	-0.0293	.2823	1.1410
Skimmed yoghurt	.19	.8335*	.1205*	-0.2224	.3998	.11	.8185*	.0681	-0.3484*	1.1736
Fruit yoghurt drink	.10	.6888*	-0.0116	.1012	1.4332	.07	.4007	-0.0108	.2957†	1.9071
Fruit juice	.08	.4031*	.0776	.1014	4.5732	.05	.4884*	-0.0141	.1239	4.5767
Soft drink	.16	.7499*	.1599*	.1555	1.6176	.23	.9020*	.2535*	.616	.9126
Coffee	.11	.5465*	-0.0325	-0.1269	7.7123	.08	.1848	-0.0135	.2742*	8.1836
Tea	.10	.5282*	.0609	.0713	5.7307	.12	.5763*	.0634	.1242	3.5694
Beer	.04	.1775	.0995	.0574	.4374	.27	1.0962*	.1149	-0.3076*	-0.5382

† $p < .10$ * $p < .05$

Also, analysis of consumer behaviour at different times of consumption improves substantially the understanding of consumer behaviour. Furthermore, this analysis made it possible to relate residential area and level of education to consumer beliefs regarding beverages.

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