

TOWARDS A MULTIDISCIPLINARY ANALYSIS OF FOOD CONSUMPTION

M.T.G.Meulenberg, Department of Marketing, Agricultural University
Wageningen

1. Introduction.

Consumer behaviour research with respect to food and other agricultural products has expanded substantially during past decades. Various important developments in this research can be distinguished.

First the number of disciplines involved in this research has increased. Research in this field started with description of consumer behaviour. Next the economic discipline entered into this research field. Today, in particular the behavioural sciences, like psychology and sociology, contribute a great deal to our understanding of consumer behaviour.

Another development in food consumption research is the availability of an increasing number of statistical methods and computer facilities.

Also food consumption research expanded because of the increasing set of data on food consumption, like consumer panel data, U.P.C. data, and data from telephone and computer aided interviewing.

In this paper on consumer behaviour research with respect to food we will concentrate on the increasing number of disciplines and of consumer behaviour models with respect to food. The increasing number of statistical methods and the larger amount of statistical data on food consumption will not be discussed.

The outline of the paper is as follows, some attention will be paid to descriptive research on consumer behaviour with respect to food. Afterwards the economic approach to consumer behaviour is discussed. Next, in separate sections, attention is paid to psychological and sociological aspects of research with respect to food consumption. Consumer behaviour with respect to food preferably should be studied by integrating various disciplines. Models of consumer behaviour integrating various disciplines have been developed, but serve up till now more as a frame of reference than as operational models of consumer behaviour. Some attention will be given to the usefulness of those models for the analysis of food consumers.

This paper does not intend to provide a complete picture of consumer research with respect to food. It tries to signal developments in consumer research which seem important for the analysis of food consumption.

2. Descriptive analysis of consumer behaviour with respect to food.

If there is no knowledge at all on the consumer of a specific food, a starting point of research is the collection of representative, reliable data. For that purpose measures are developed to describe food consumption behaviour. Statistics have been developed in order to arrive at representative reliable and comparable food consumption data (e.g. Prais Houthakker, 1955; Ferber and Verdoorn, 1962, Ferber (ed.) 1974). Consumer

equivalence scales in budget analysis are a case in point (see for instance Blokland, 1976).

Interesting is the fact that by comparing reliable and representative data on food consumption it has been possible to derive empirical laws. Engel's law is a case in point.

Fitting data on food consumption to a descriptive model provides opportunities to forecast future consumption. Such forecasting on the basis of descriptive models is based on the assumption that food consumption changes gradually according to a pattern established from the past. Time series analysis, like decomposing a series into a trend, a seasonal component, a business cycle component and an error term, or more advanced procedures, like the Box Jenkins procedure, may be useful methods for forecasting food consumption by extrapolation (see for instance Makridakis, Wheelwright and McGee, 1983).

Other mathematical models describing time series like the logistic curve, the Gompertz curve and the modified exponential curve do not simply describe consumer behaviour but imply also a specific process of consumer behaviour. For instance, the logistic curve implies imitation by consumers, which determines the diffusion of a product in the market (see for instance Mahajan and Muller, 1979).

It should be stressed that many diffusion models consider only first purchase of a product and not repeat buying which, however, is essential for food products. More elaborated models consider repeat buying too (Parfitt Collins, 1968; Blattberg and Golanty, 1978; Silk and Urban, 1978). Patterns in consumer behaviour with respect to food can also be described by probability distributions. Amongst others, Ehrenberg did interesting work in this field by fitting a negative binomial probability distribution to the number of purchases of a particular brand of a frequently bought good in a time period (Ehrenberg, 1972, 1975). The usefulness of this approach was recently advocated by Schmittlein a.o. (1985) on the basis of further elaboration of Ehrenberg's model.

Descriptive analyses of consumer behaviour with respect to food and other agricultural products are important to marketing managers. They offer a picture of consumer behaviour and also the possibility for forecasting under ceteris paribus conditions. However, they suffer from shortcomings in not explaining why consumers behave in a particular manner. For that purpose economic and behavioural analyses are needed.

3. The economic analysis of consumer behaviour with respect to food.

The micro-economic approach towards consumer behaviour is based on a set of axiomatics which characterize the 'Economic man'. They are summarized by Green as: Completeness, transitivity, rational choice, non saturation, continuity of preferences, strict convexity and smooth indifference curves (Green, 1971; see also for instance Philips, 1974, or Deaton and Muelbaumer, 1980). This axiomatic basis of consumer behaviour has served the

analysis of food consumption. From utility functions demand functions have been derived which have to satisfy the following restrictions: homogeneity of degree zero in income and prices; and the sum of all direct and cross price elasticities with respect to prices of any commodity has to be equal to minus its income elasticity (e.g. Philips, l.c.). In conjunction with empirical research on consumer behaviour this economic theory on consumer behaviour has been refined. Demand analyses on the basis of time series data and budget data are numerous. Classic studies which mark the route in this field of economic research are those of Schultz, Wold, Stone, and Theil, (Schultz, 1938; Wold and Jureen, 1953, Stone a. o, 1954; Theil, 1975, 1976). It has become a routine to determine price and income elasticities of food products for various countries (see for instance the studies of McFarquhar (ed.), 1971; Gollnick, 1975, Viaene, 1978, Boddez a.o. 1980, Wöhlken, 1981; Haen a.o. 1982; Ministry of Agriculture, Fisheries and Food). Analyses of food consumption determining the influence of prices and income profit from better data both in quantity and quality. The increasing amount of consumer and household data have led to economic analyses which establish the influence of prices and incomes for different segments of the market, for different varieties, for brands (e.g. see Neslin and Shoemaker, 1983) and for various stages of the product life cycle (Simon, 1979). U.P.C. data, amongst others, increase the opportunity for analyzing short term effects of price changes on demand.

The increasing amount of market data has stimulated economic analyses which incorporate also social and demographic variables (e.g. Salathe and Buse, 1979; Smallwood and Blaylock, 1981) Economists have been aware of the limitations, sometimes irreality, of the axiomata of the micro-economic theory of consumer behaviour. In various ways this theory and research methods to analyse consumer behaviour are extended. Important in the context of this paper are refinements which delivered new models and research methods to analyse consumer behaviour with respect to food and other agricultural products. An important development has been the dynamic version of the classic theory. A great many models are proposed which contain lagged prices and lagged income as an explanatory variable. While the concept of lagged influences was introduced in economic theory already in 1925 (Fisher, 1925), Koyck introduced his well known distributed lag model in 1954 and Nerlove introduced partial adjustment models in the analysis of supply and demand of agricultural products (Koyck, 1954; Nerlove, 1956, 1958). Nerlove distinguished the following causes for a lagged behaviour of consumers: technological reasons-existence of complementary products, like freezers and perishable food; institutional reasons-for instance, contractual obligations or an imperfect market; psychological reasons; for instance consumer habits have to be changed firstly or consumers' expectations about future market developments impede changes in consumption. A great many distributed lag models have been proposed in order to describe lagged reaction of consumers on changes in prices and disposable income (e.g. Solow, 1960; Almon, 1965; for a survey see Judge, Griffiths, Hill and Lee, 1980). They concern

themselves in particular with mathematical and statistical properties and with the forecasting power of models. They are poor in the underlying argumentation for this lagged behaviour. Authors of distributed lags models confine themselves to specific assumptions about behaviour and concentrate on statistical estimation of models and its outcome, in terms of demand. Statistical testing has to prove whether the assumptions made about consumption are appropriate.

Changes in taste have been incorporated by dynamizing the utility function. By dynamizing the utility function, according to Philips: 'A theoretical foundation of the existence of lags would thus be obtained', in the sense that lagged responses would appear as being implied by utility maximization, rather than as a result of inertia or frictions or other apparently 'irrational' circumstances' (Philips, 1974).

Houthakker and Taylor have dynamized demand functions by assuming that consumers strive for a certain state $s(t)$ in the consumption of a particular product. In the case of durable goods this state is the physical stock and in the case of non durables this state is called by Philips the 'Psychological stock of habits' (Houthakker and Taylor, 1970; Philips, 1974). Houthakker and Taylor applied their model also to food products. Gollnick used the model for analysing the demand for food in the Federal Republic of Germany (Gollnick, l.c.).

Also in macro-economic theory of consumer behaviour additional elements have been introduced. Keynes introduced 'The fundamental psychological law, upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income'. (Keynes, 1936). Duesenberry suggested the highest income in the past as an additional variable to present income in order to explain the level of consumption, viz. savings (Duesenberry, 1949). He argued that habit formation, caused by the highest income in the past was an important variable.

The argument has been extended by Friedman in his permanent income hypothesis, which says that there is a fundamental relationship between permanent consumption and permanent income, the income which is expected to depend on the actual income but also on wealth and anticipated income by a consumer over his life span (Friedman, 1957). Modigliani, Brumberg and Ando developed more or less independently a similar version of the permanent income hypothesis (Modigliani and Brumberg, 1954; Modigliani and Ando, 1960).

Habit formation has been operationalised in the consumption function also by introducing consumption in the foregoing period as an explanatory variable (Brown, 1952). It has been also considered by Pollak (1970) in a system of demand equations by introducing consumption in the past as an explanatory variable in the individual's present utility function (see also Philips, 1974).

The way consumers derive utility from products has been

elaborated by introducing the concept of weak separability, which says that two or more products are weakly separable from other goods when their marginal rate of substitution is independent from the level of consumption of these other goods. Therefore consumption of a group of goods, being weakly separable from other goods, can be analysed independently from these other goods.

Another extension of economic theory has been the development of systems of demand equations, satisfying the general restrictions of demand theory (homogeneity of degree zero in income and prices, symmetry and negative definiteness of the compensated cross price terms and share weighted sum of income elasticities equal to one (Swamy and Biswanger, 1983)). An example is the linear expenditure system as developed by Stone (Stone, 1954), Klein and Rubin (1947/48). Linear expenditure systems are applied to consumption of product groups but also on food products (for instance, Mc Farquhar a.o. 1971) and on the demand for flowers (Van Tilburg, 1984). Other type of systems of demand equations are developed like the so called Rotterdam model (see Barten, 1966, 1967 and Theil, 1975, 1976), the indirect Addilog Model (see for instance Somermeyer and Langhout, 1972) and the Almost Ideal Demand System (AIDS) (Deaton, Muelbaumer, 1980).

The way consumers derive utility from goods has been elaborated in economic theory by the characteristics of goods theory, which says that essentially consumers derive utility from the characteristics of which a product is composed (Lancaster, 1966, 1971, 1979; Ratchford, 1975, 1979; Ladd, 1982; Wierenga, 1984). This theory requires that it is possible to measure these characteristics and to establish the amount of various characteristics in products. Also Lancaster assumes in his theory a linear consumption technology, a utility independent distribution of characteristics among products and non negative marginal utility of every characteristic (see Ladd, l.c.). The characteristics of goods theory might bridge the gap between economic theory and behavioural analysis of consumers' perception if 'characteristics' of goods could be transformed into product attributes as perceived by consumers. The theory provides also an economic basis for analyzing the demand for nutrients like carbohydrates (Adrian and Daniel, 1976; Price a.o., 1978). In economic analyses of consumer behaviour on the basis of budget or panel, data, socio-economic variables, like family size and social class, have been incorporated (e.g. Salathe, Buse 1979; Smallwood and Blaylock, 1981). These variables are included often without a basic theoretical foundation. Basiotis a.o. analysed the impact of socio-economic variables on diet component availability (Basiotis, a.o., 1983).

Kapteyn quotes authors who have incorporated social interaction into economic analyses of consumer behaviour, like Prais and Houthakker (1955), Green (1971), Somermeyer and Bannink (1973) and Pollak (1976). He uses the social reference group as a explanatory variable in the individual welfare function (Kapteyn, 1977).

In summary, it seems to us that the great progress made by the economic theory in the analysis of consumer behaviour is in particular related to market demand for a generic product.

Hanemann (1984) develops a framework for models of consumer choice which have as a special case models of discrete choice among brands. However, economic theory does not help so much to analyse consumer demand in various market segments in order to improve the position vis a vis competitive supply, or in order to change the marketing mix, in particular, product and promotion. This requires multidisciplinary research.

There are recent streams of research which seem to stimulate contacts between economic research and behavioural research on consumer behaviour. Interesting in this respect are the research on utility theory and on quality (Hanemann, 1982), the work of Van Praag and his colleagues on welfare functions (Van Praag, 1968, 1971 and 1985) and research on the characteristics of goods (Wierenga, 1984). It seems that in particular the need of marketing theory, marketing decision makers and market researchers for a multidisciplinary approach in order to solve real life problems in the market stimulates exchange between the economic and behavioural analysis of consumer behaviour.

4. The behavioural analysis of consumer behaviour with respect to food.

The behavioural approach toward consumer behaviour with respect to food products is not limited to an analysis of the relationship between a market stimulus and consumer response but tries to analyse in particular what factors of the organism (in our case, the consumer) transform the received stimuli into a response and in what manner this transformation takes place. A great many intervening variables, constructs, are introduced to analyse consumer behaviour properly. Important is also that the consumer decision process is looked upon as a problem solving process containing a number of stages which seem all relevant to the outcome of the consumer decision process. Foregoing points can be illustrated by the approach of Jacoby and Olson towards consumer's response to price (Jacoby and Olson, 1977). These authors distinguished in a S-O-R model S(timulus) O(rganism) R(espone) 'objective' price against 'perceived' price; e.g. is the objective price understood by the consumer as cheap, expensive ...'. The way a perceived price is influencing the outcome of the decision process is, according to Jacoby and Olson, determined by the factors: storage of price, price consciousness and recall ability. These factors together develop an attitude toward the perceived price. The integration of the perceived price with other information finally will bring about a 'purchase' or a 'not purchase'. Such an approach stimulates all types of research with respect to consumer behaviour in relation to prices: research on the acquisition of raw prices and of unit prices by consumers; on the encoding of price as monetary cost or as quality indicator or as conspicuous consumption; on the problem of thresholds in perception of prices (the model of Gabor and Granger is based on the hypothesis that consumers have in mind a minimum price below they will not purchase a product because it is considered of inferior quality and a maximum price

beyond they will not buy because the product is too expensive (Gabor and Granger, 1966)); on the concept of a reference price, which consumers are supposed to use when evaluating the price of a specific offer (Kamen and Toman, 1970). For instance, some authors suggest that the price 'normally paid in the past' is the reference price (Gabor and Granger, 1966). Other authors suggest that the reference price is the price last paid (Uhl, 1970). A great many aspects of consumer behaviour have been studied, like motivation, information processing, perception, attitude and preference. A content analysis of consumer behaviour articles in selected American journals and proceedings from 1950 through 1980 showed the following topics to be the most important (in terms of % articles on that topic): Attitudes (8,2%), Perception (8%), Choice (4.9%), Consumerism (4.7%), and Information Processing (4.6%) (Helgeson a.o., 1984). A number of these aspects of consumer behaviour will be discussed in the following sections.

4.1. Analysis of consumers' motivations.

Research on motives for food consumption is less numerous than on attitudes, perception and preference. Is this related to the fact that some motives are rather obvious - like the primary needs thirst, hunger - while motives to consume a particular food are often very specific?

Motivations research as a method of determining consumers' motives for food has been propagated amongst others by Dichter (e.g. Dichter, 1964). It definitely offers creative insights into consumer motivation, but lacks the potential to provide a representative picture of consumer motives for a specific product. Is the well known hierarchy of needs of Maslow useful in analysing motives for consumption of food products? The increased consumption of snacks and similar products at special occasions and during the day illustrate the increasing importance of social needs to food consumption. The increasing importance of 'do it self' in cooking, and preparing all kinds of meals might be related to the need for self fulfilment. The latter development has been forecast to continue by a Nestlé group for the West German market up till the year 2000 (N.N., 1985). Scientific research showing the usefulness of Maslow's approach is, to our knowledge scarce.

Many questions about changing motives of consumers towards food products are raised by marketers and nutritionists but answers are scarce. For instance, what is the impact of the changing self concept of housewives, as affected by womans' emancipation, on motivation for food purchasing and food consumption. There have been many published attempts to measure self-concept and to relate it to particular aspects of buying behaviour. The results have been disappointing, to say the least (Engel and Blackwell, 1982). Standard methods of measuring motives, like self rating, have not been used to a great extent in market research. AIO questions related to the behaviour under analysis are a substitute, but to our knowledge not so much used in measuring motivation for food consumption. Nevertheless it may be a useful method to get more knowledge of consumer motivations. Additional insights in consumers' motivation may be provided by measuring

the ideal state and, in this way, motives of a consumer.

4.2. Information processing by consumers.

Information collection and processing are very important to consumer behaviour. Exposure, attention, comprehension and retention have been analysed as stages in the information process.

Some authors have made information processing the central issue of consumer behaviour. For instance Bettman's model serves as a frame of reference in analysing information collection and processing in consumer decision making. In distinguishing direction, degree, and pattern of search Bettman offers a categorisation of research fields on information collection and information processing, which seems fruitful to consumer research in the field of food and other agricultural products (Bettman, 1979). Interesting in this respect is Bettman's discussion of 'Product class' choice and 'Brand' choice. 'Product class' choice is a difficult choice process and consumers may prefer in that case 'attribute' processing. Consequently they use constructive, in-store, and recognition methods' (see Bettman, 1979). These points seem relevant for food consumption since consumers often make a choice between products of different product classes. It requires understanding of how attributes of food products are perceived by consumers. It suggests also that in store behaviour of consumers is of great importance to the sales of food products, which are not sold under brand, like perishables. Bettman suggests procedures to analyse information processing which might be relevant to purchasing food products too. It seems that the propagated 'decision net' - the flowchart which describes in detail how consumers appear to combine attribute and situational information in a decision (Bettman, 1979) - has not much contributed toward the knowledge of consumer behaviour with respect to food. The great detail in the description of the decision process and the small sample involved in this type of research make it very difficult to generalize research results by decision nets towards a large group of consumers. Van Raay used information matrix, direct observation and eye fixation as methods for analysing the information processing by consumers (Van Raay, 1977). These methods are also useful for the analysis of information on the package, in particular in view of the increasing concern about nutritional information for consumers. In fact, in the Netherlands consumers consider the package to be very important for information about food (Steenkamp, Wierenga, and Meulenberg, 1985). A promising procedure for the analysis of information processing strategies by consumers is the information integration approach which studies the combination rules used by subjects in order to form some judgment on the basis of pieces of information supplied to the consumer (Anderson, 1981, 1982, Lynch, 1985). This approach has been successfully applied to food products (Levin and Johnson, 1984).

Many variables affect search behaviour for food products like: market environment, situational variables, knowledge and experience, individual differences, conflict and conflict-resolution strategies, risk involved, importance of product

attributes and time pressure (Bettman, 1979). We need more information on these subjects in order to do an effective and efficient job in food-information by marketing and extension. But we need also more knowledge about potential information overload in food marketing, in particular since there seems no generally accepted conclusion on its presence yet (see for instance Jacoby a.o., 1974; Malhotra, Jain and Lagakos, 1982; and Jacoby, 1984). This topic is also important with respect to nutritional information (Lambert, 1977).

4.3. Attitude research

A great many intervening variables and processes have been studied in consumer research. One of the well elaborated concepts is consumers' attitude. At the macro level consumers' attitudes have been analysed extensively by Katona and his coworkers at the Michigan Survey Center. As early as the period 1954-7, attitudinal questions were addressed to representative samples of urban population (Katona, 1960): Information on changes in attitudes and expectations helps to explain changes in demand. Katona stated: 'That studies of consumer attitudes serve primarily to enable us to understand and predict the direction, rather than the magnitude, of changes in demand does not detract greatly from the value of such studies' (Katona, 1960). The pioneering research of Katona on consumers' attitudes has led towards a vast amount of research on consumers' attitudes and on statistics like the Index of Consumers' Sentiment. There have been various studies on the usefulness of this Index of Consumers' Sentiment as an independent explanatory variable of consumer behaviour. For instance, Shapiro concluded that for the U.S. the Index of Consumer Sentiment could be explained by economic variables, like income, inflation rates, and stock prices (Shapiro, 1972). He therefore questioned the usefulness of the Index of Consumer Sentiment as a separate explanatory variable. Also other authors have expressed doubts about the usefulness of this Index as an explanatory variable of behaviour (Van de Abeele, 1983; Kasper, Kuilen, 1984). Praet (1985), however, concluded on the basis of data over the period 1975 - 1983 that the Consumer Confidence Index in four EC countries could be explained by economic variables but in addition by time lags of one period and two periods of the Consumer Confidence Index. It implies, according to Praet, that consumer surveys do actually contain original information helpful in short-term forecasting.

Attitude research with respect to individual products or group of products is numerous. Various types of attitude research have been developed: a) the cognitive-affective-conative model which in marketing theory has been used as the hierarchy of effects model; b) the expectancy-value model, which assumes that attitudes are built up by two components, beliefs and values; it does not contain a behavioural element like foregoing definition does. It is argued that because of the foregoing omission, expectancy-value models provide a better description of consumer behaviour with respect to brands as compared to the behaviour with respect to a generic product (Hughes, 1977). As a diagnostic

device knowledge of attitudes towards a product, seems very useful for the analysis of the position of a food product. While attitude scales of the Likert type and Semantic differential scales have been (and still are) used often in the analysis of consumer behaviour with respect to food, more use has been made during the last years of multi attribute models like the Fishbein model, the Tromsdorf model and multivariate models like factor analysis and multidimensional scaling. Termorshuizen (1982) analysed the attitudes of consumers vis à vis a great many drinks by the Fishbein model and concluded that this analysis was consistent with a multidimensional scaling of the perception of drinks. Woodside, Boarden and Clockey (1977) measured attitudes for drinks in a specific action situation. Werner analysed consumer attitudes towards apples by means of factor analysis (Werner, 1982). Deters measured consumers' attitudes with respect to fresh vegetables on the basis of the Tromsdorf model (Deters, 1985). Multidimensional analysis of consumer attitudes for food and agricultural products has provided, in particular, information on specific attributes of a product. It does not seem to us that overall attitude measures are that much used in 'real life' marketing policies.

Attitudes toward objects often are measured without considering the influence of the environment during the measurement and during the time of the decision process (Hughes, 1977). This critique can be overcome to a certain extent by the proposal of Fishbein to study attitudes with respect to a social object in relation to a particular action situation. In fact, consumers' attitudes to liquid milk in the Netherlands appeared to differ substantially according to the time of consumption during the day (Termorshuizen, Meulenberg, Wierenga, 1986; in press).

The diagnostic power of attitude measurement is very useful for market segmentation, in principle at least. It suffers, however, from the fact that some methods of attitude measurement do not contain behavioural elements. Results of attitude research are also constrained by the 'eternal' problem of limited knowledge about the influence of attitudes on actual behaviour. In conclusion, food marketers dispose of a great many research methods for measuring attitudes, which certainly need improvement on various aspects (see for instance Bagozzi (1984)). An extension which seems promising is the combination of various attitude scales in one analysis by the Lisrel method (see for instance Bagozzi, 1980). We agree, however, with Hughes that: 'Marketing researchers are advised to examine the more complete behavioural models that are available in the psychological literature before they spend resources with empirical refinement of the incomplete models that they are using presently' (Hughes, 1977).

4.4. Perception and preference analysis.

On the basis of experience stored in the long term memory and of information acquired in the market consumers develop perceptions of products. Product perception by consumers has been explored by multidimensional scaling and by other multivariate techniques. These research methods appear to be very useful in research on

product positioning, product development, and other marketing activities, like pricing or advertising (see for instance Wierenga, 1980; Wind, 1982; Urban and Hauser, 1980; Smidts and Wierenga, 1983; Termorshuizen, Meulenberg and Wierenga, 1986, in press; Werner, 1982; Ackerman, a.o., 1981). Conjoint measurement is a flexible procedure to analyse the effects of specific product attributes on consumer preference (see for instance Green and Srinivasan, 1978; Urban and Hauser, 1980). Another important issue in this respect is quality perception by consumers: what are the quality attributes of a product, which quality indicators are used by consumers and what is the relationship between quality and preference (see for instance Steenkamp, Wierenga and Meulenberg, 1985)?

An interesting point is to what extent multidimensional and multivariate analysis of consumer behaviour can bridge the gap between behavioural and economic theories on consumer behaviour, like the characteristics theory of Lancaster. Research of Wierenga on this subject suggests that we can not be very optimistic in this respect yet (Wierenga, 1984).

4.5. Learning by consumers

Many examples can be given which show the importance of learning in consumer behaviour with respect to food. Much advertising for alcoholic drinks seems an example of classical conditioning (see e.g. Engel and Blackwell, 1982). The impact of experience with a branded food product on brand loyalty seems an example of operant conditioning. Early research in this field was characterizing the brand choice process: for instance Brown analysing consumer panel data of 1951 of the Chicago Tribune, classified consumers in undivided loyalty, divided loyalty, unstable loyalty and no loyalty, and argued on the basis of his analysis '... the ideal situation seems to be to avoid the extremes of loyalty or non-loyalty' (Brown, 1953). Later studies, in particular since the path breaking research of Kuehn (Kuehn, 1961), were aiming at describing brand choice processes by quantitative models. Many studies on brand choice have been made. It is out of the scope of this paper to describe in detail the evolution of brand choice modelling. The reader is referred for that purpose to studies of Massy, Montgomery and Morrison (1970) and textbooks of Naert and Leeflang (1978) and Lilien and Kotler (1983). In general the following stochastic brand choice processes are distinguished: (a) the Bernoulli process: The probability of choosing a particular brand at a purchase occasion is constant, irrespective of the purchase history; (b) the Markov-process: the probability of purchasing a certain brand at a given purchase decision depends on the brands chosen at a limited number of previous purchase occasions, e.g. one or two occasions and (c) the Linear Learning model, the probability of purchasing a specific brand at a purchase occasion t is a linear function of the corresponding probability at occasion $(t-1)$ and depends therefore, on the total foregoing purchase history.

Wierenga found the linear learning model to be superior to zero and first order Markov models in describing the brand choice process of Dutch consumers for coffee, beer and margarine

(Wierenga, 1974).

It has been considered a weakness of the classic brand choice models that no influence of marketing variables is included. Various authors have proposed therefore stochastic brand choice models containing marketing variables, like price (e.g. Harary and Lipstein, 1962; Hartung and Fisher 1965; Lee, Judge and Zellner, 1970; Lilien, 1974; Jones and Zufryden, 1982; Carpenter and Lehmann, 1985).

According to Lilien and Kotler (1983) stochastic models of consumer behaviour are most appropriate where a major element of the choice process involves uncertainty (versus rational choice), as in the case of low-involvement goods. In fact there seems to be at present a fundamental battle between national and other brands, in particular private brands of retailers. This competition is difficult to describe by a model which assumes that consumers behave according to a fixed pattern of probabilities and past behaviour. In fact, marketing variables today seem to have a dominating influence on the position of various brands in the market. Research on brand perception and preference seems to be of great importance to the evaluation of the future market share of a particular brand. Further extension of 'mixed brand choice models', which combine stochastic consumer behaviour with marketing mix influence seems useful also in order to explain brand choice for food products.

Consumer habits are another element of learning which is important to food. Consumer habits originate from experience, but are also influenced by reference groups, families, and information about products. The consumer develops habits and roles which slow down the drive towards variety and new food. Therefore it is important to understand how to change food habits. Change of food habits will have to be brought about by education and information. Are, consequently, cognitive theories of learning becoming more relevant: 'This ability to perceive or to know what the outcome of an action will be is one of the basic tenets of the cognitive theories' (Markin, 1969)?

4.6. Sociological aspects of consumer behaviour with respect to food.

According to Nicosia and Mayer: 'The domain of a sociology of consumption concerns the study of three classes of variables: cultural values, institutions and their norms, and consumption activities. It also includes the study of the possible interrelationships between these classes of variables...' (Nicosia, Mayer, 1976). The distinction made between the direct influence of cultural values on the consumers behaviour and the influence of cultural values on consumer behaviour through institutions, like family, school etcetera, seems valuable. Various groups influence behaviour. In the case of food the impact of family on consumer behaviour is of great importance. For instance, to what extent are children enforced to drink milk at home and is the pressure of parents changing in this respect. In the Netherlands this pressure is decreasing. Another aspect of family life, important for food consumption, is the structure of the decision making process in the family. For instance, Davis

and Rigaux concluded that in food buying wives are dominant (Davis, Rigaux, 1974). Is this generally true and does this pattern change over time? Changes in family role of women may influence decision processes for food purchasing as well. Darden a.o. differentiate various groups of women according to their role orientation and distinguish four classes from: 'Moderns', (disagreeing that shopping is the responsibility of women) to, at the other extreme, 'Apple Pie Moms' (.. the traditional home makers, feeling strongly that children, the home, and shopping are the province of the female) (Darden, a.o. 1983). Interesting is also to what extent other groups are important in influencing consumer behaviour with respect to food. Reference groups in school and cafeterias may influence food consumption behaviour. Little is known yet in this respect. Social class has been introduced as a crossing variable in many analyses of consumer behaviour with respect to food, or as an explanatory variable in regression analysis of the demand for food and other agricultural products (see for instance Van Tilburg, 1984; Viaene, 1978).

While it is observed that the possession of durable consumption goods is related to social class, this can not be observed to such an extent for food except for luxuries like some kinds of wine, sherry, special cheese and the like. Social class seems to lose importance in influencing food consumption because of mass production and mass consumption.

It is useful also to investigate cultural developments which might have a strong impact on food consumption. Important in this respect are the concern about health (coronary diseases, cancer), concern about weight, criticism of additives in food and of production methods for some agricultural products and food. Various products fit to these changes in values and norms: dietary products, low calory food and organic food. As a consequence of such development attitudes towards traditionally much respected foods have changed. Liquid milk is a case in point (Termorshuizen, Meulenberg and Wierenga, 1986, in press). Changes in cultural trends are a long term process which in particular seems important for product development.

Changes in norms and values with respect to food products are characterised by Giscard d'Estaing as a new look at health and a more hedonic way of life (Giscard d'Estaing, 1985). With respect to the first point he argues that today 'depuis un quinzaine d'années l'idée se développe que la santé constitue un capital qu'il convient de protéger en prenant des mesures préventives'. With respect to the second he argues that not only the visual aspect counts but visual and other elements like odour, taste etcetera give an integrated sensual experience to consumers. The Taylor/Nelson Group Limited in England classified groups having different values and life styles, on the basis of the research by the Stanford Research Institute, as: survivors and aimless orientating themselves on primary values like feeding clothing and living; conspicuous and belongers, orientating themselves on external values: welfare and status; self explorers and social resisters, orientating themselves on inner values: growth of personality and self fulfilment; and experimentalists orientating themselves on both external and inner values (as

quoted in Schogt en Beek (ed.), 1985).

The drive for natural food products has stimulated demand for organic food. Consumer research in the field of organic food should not be concerned only with motivations, attitudes and actual behaviour of organic food consumers. It should also investigate to what extent strict organic food consumers, stimulate other people to become a consumer of organic food, sometimes in a more mitigated form and stimulate changes in 'classic' food.

Penetration of a product in a group, also a sociological research topic, has been studied for a long time already. Diffusion models and adoption models, like those of Bass, Mansfield and Rogers assume that group members influence each other in the adoption of new products (see Mahajan and Muller, 1979). The classification of Rogers in innovators, early adopters, early majority, late majority and laggards is particularly interesting in this respect (Rogers, 1962; Engel and Blackwell, 1982). While these groups, as distinguished by Rogers, seem to have specific features this has not been observed clearly in the diffusion of food products. Kleyngeld found in the Netherlands as the most distinguishing characteristic of innovators in food consumption: involvement in food. (Kleyngeld, 1971).

Important to food consumption are also demographic trends in western population: smaller families, more older people, stagnating population size, and an increasing importance of minority groups. Many minority groups have a different food consumption pattern as the autochton population. For instance in a recent research on expenditure of ethnic groups in the Netherlands it appeared that ethnic groups had a much higher level of per capita consumption of meat, of potatoes, fruit and vegetables and of pulses than comparable Dutch families and the average Dutch family. This was in particular true for the ethnic groups from Morocco and Turkey (Veldkamp, 1985). In view of the expected absolute and relative increase of the ethnic groups in West European countries it seems worthwhile to get more understanding of the food habits of these groups.

McCann and Reibstein distinguish analyses of the impact of socio economic and demographic changes on product demand at four levels: level 1, information on demographic and socio economic characteristics: level 2, 3 and 4, aside from the information of level 1 there is also information available on consumer response to marketing mix variables (McCann and Reibstein, 1985).

5. Some final words about integral consumer behaviour models.

In the sixties some large scale models of consumer behaviour have been proposed which have had a great impact on the theory and research of consumer behaviour (Nicosia, 1966, Howard Sheth, 1969; Engel Koll at and Blackwell, 1968). These models include different stages of the decision making process and a great many relationship between a great many intervening variables and external stimuli. Integral models of consumer behaviour have been, and are yet, very useful in order to develop research

hypotheses about consumer behaviour with respect to food. The difficulty to measure the intervening variables included in these models make it hard to estimate the relationships as hypothesized in these models for a specific product (for a review of some examples the reader is referred to Engel and Blackwell, 1982). Consequently these models will have to be curtailed substantially for quantitative research. Termorshuizen, Meulenberg and Wierenga used the Engel, Kollat and Blackwell model as a frame of reference for the analysis of liquid milk consumption in the Netherlands (Termorshuizen, Meulenberg and Wierenga, in press). It seems that the interest of behavioural theory on consumer behaviour is shifting towards models which are more limited of scope and which spell out in more detail the section of consumer behaviour under analysis, for instance models which concentrate on the formation of quality judgments on food products (Steenkamp, Wierenga en Meulenberg, 1985). It will be necessary to find a way out between complete, but hardly measurable integral models, at the one side, and measurable but too simple single variable models - like demand functions - at the other side.

.....

REFERENCES

- Abeele, P. van de, 1983, The Index of Consumer Sentiment: Predictability and Predictive Power in the EEC, Journal of Economic Psychology, 4, pp. 1-17.
- Ackerman, L., K. Callier and G. van Heghe, 1981, Konsumentenonderzoek op de Markt van Konsumptiemelk, LEI-schriften nr. 220/RR-179, Landbouw-Economisch Instituut, Brussel.
- Adrian, J. and R. Daniel, 1976, Impact of Socioeconomic Factors on Consumption of Selected Food Nutrients in the United States, American Journal of Agricultural Economics, 58, pp. 31-38.
- Almon, S., 1965, the Distributed Lag Between Capital Appropriations and Expenditures, Econometrica 33, pp. 178-196.
- Anderson, N.H., 1981, Foundations of Information Integration Theory, New York.
- Anderson, N.H., 1982, Methods of Information Integration Theory, Academic Press, New York.
- Bagozzi, R.P., 1980, Causal Models in Marketing, John Wiley and Sons, New York.
- Bagozzi, R.P., 1984, Expectancy-Value Attitude Models: An Analysis of Critical Measurement Issues, International Journal of Research in Marketing, 1 (4), pp. 295-310.
- Barten, A.P., 1967, Evidence on the Slutsky Conditions for Demand Equations, Review of Economics and Statistics 49, pp. 77-84.
- Barten, A.P., 1966, Theorie en Empirie van een Volledig Stelsel Vraagvergelijkingen, Pasmans Den Haag.
- Basiotis, P., Brown, M., Johnson, S.R. and K.J. Morgan, 1983, Nutrient Availability, Food Costs and Food Stamps, American Journal of Agricultural Economics, 65 (4), pp. 685-693.
- Bettman, J.R., 1979, An Information Processing Theory of Consumer Choice, Addison-Wesley Publishing Company, Reading (Mass.).
- Blattberg, R.C. and J. Golanty, 1978, Tracker: An Early Test Market Forecasting and Diagnostic Model for New Product Planning, Journal of Marketing Research, 15 (May), pp. 192-202.
- Blokland, J., 1976, Continuous Consumer Equivalence Scales, Martines Nijhoff, The Hague.
- Boddez, G. Ernens, M., a.o., 1980, A Systematic Approach to Agricultural Forecasts of 1985 for the European Community of Nine, Commission of the European Communities, Information on

Agriculture no.77, Brussels.

Brown, G.H., 1953, Brand Loyalty - Fact on Fiction, Advertising Age, Vol. 24. Also published in Ehrenberg A.S.C. and F.G. Pyatt, (ed.) 1971, Consumer Behaviour, Penguin Books Ltd. Harmondsworth.

Brown, T.M., 1952, Habit Persistence and Lags in Consumer Behavior, Econometrica 20.

Carpenter, G.S. and D.R. Lehmann, 1985, A model of Marketing Mix, Brand Switching and Competition, Journal of Marketing Research 2 (November), pp. 318-340.

Darden, W.R., S.J. Miller, S.M. Carbron, and D.K. Darden, 1983: Measurement and Classification of Sex Role Orientations: Sex Role Types and Patronage Attitudes, in: Darden W.R. and R.F. Lusch (ed.), 1983, Patronage Behavior and Retail Management, North Holland.

Davis, H.L. and B.P. Rigaux, 1974, Perception of Marital Roles in Decision Processes, Journal of Consumer Research 1 (June), pp. 51-61.

Deaton, A. and J. Muelbaumer, 1980, Economics and Consumer Behaviour, Cambridge University Press, Cambridge.

Deters, S., 1985, Analyse der Verbraucher- und Händlerpräferenzen bei Frischgemüse, Forschungsberichte zur Ökonomie im Gartenbau Nr. 55, Hannover und Weihenstephan.

Dichter,, E., 1964, Handbook of Consumer Motivations, McGraw Hill, New York.

Duesenberry, J.S., 1949, Income, Saving and the Theory of Consumer Behavior, Harvard University Press Cambridge (Mass.).

Engel, J.F., D. Kollat and R.D. Blackwell, 1968, Consumer Behavior, The Dryden Press, Chicago.

Engel, J.F. and R.D. Blackwell, 1982, Consumer Behavior, Fourth Edition, The Dryden Press, Chicago.

Ehrenberg, A.S.C., 1972, Repeat-Buying: Theory and Applications, North Holland, Publishing Company, Amsterdam.

Ehrenberg, A.S.C., 1975, Data Reduction: Analysing and Interpreting Statistical Data, John Wiley and Sons.

Ferber, R. and P.J. Verdoorn, 1962, Research Methods in Economics and Business, The Macmillan Company, New York.

Ferber, R. (ed.), 1974, Handbook of Marketing Research, McGraw Hill Book Company, New York.

Fisher, I., 1925, Our Unstable Dollar and the So-called Business

- Cycle, Journal of the American Statistical Association 20, pp. 179-202.
- Friedman, M., 1957, A Theory of the Consumption Function, Princeton University Press, Princeton.
- Gabor, A. and Granger, C.W.J., 1966, Price as an Indicator of Quality: Report on an Inquiry, Economica, 46, pp. 43-70.
- Giscard d'Estaing, H., 1985, L'évolution des moeurs alimentaires des Français, Revue Française du Marketing, no. 102 (Mars-Avril), pp. 5-8.
- Gollnick, H.G.L., 1975, Dynamic Structure of Household Expenditures in the Federal Republic of Germany, North Holland Publishing Company, New York.
- Green, H.A., 1971, Consumer Theory, Penguin Modern Economic Texts, Penguin Books Ltd., Harmondworth.
- Green, P.E. and V. Srinivasan, 1978, Conjoint Analysis in Consumer Research: Issues and Outlook, Journal of Consumer Research, 5(September), pp. 103-123.
- Haen, H. de, K.N. Murty and S. Tangermann, 1982, Künftiger Nahrungsmittelverbrauch in der Europäischen Gemeinschaft, Schriftenreihe des Bundesministers für Ernährung, Landwirtschaft und Forsten, Heft 271, Landwirtschaftsverlag G.m.b.H., Münster-Hiltrup.
- Hanemann, W.M., 1982, Quality and Demand Analysis, in Rauser G.C. (ed.), 1982, New Directions in Econometric Modeling and Forecasting in U.S. Agriculture, pp. 55-98, North Holland, New York.
- Hanemann, W.M., 1984, Discrete/Continuous Models of Consumer Demand, Econometrica 52 (3), pp. 541-560.
- Harary, F. and B. Lipstein, 1962, The Dynamics of Brand Loyalty: A Markovian Approach, Operations Research, 10, pp. 19-40.
- Hartung, P.H. and J.L. Fisher, 1965, Brand Switching and Mathematical Programming in Market Expansion, Management Science, 11, pp. 231-243.
- Helgeson, J.G., E.A. Kluge, J. Mager and C. Taylor, 1984, Trends in Consumer Behavior Literature: A Content Analysis, Journal of Consumer Research, 10 (March), pp. 449-454.
- Houthakker, H.S. and L.D. Taylor, 1970, Consumer Demand in the United States, 1929-1970, 2nd. ed. Harvard University Press, Cambridge (Mass.).
- Howard, J.A. and J.N. Sheth, 1969, The Theory of Buyer Behavior, John Wiley and Sons, New York.

Hughes, G.D., 1977, New Developments in Attitude Theory: Déja Vu? In: Wind, Y. and M.G. Greenberg (ed.), Moving A Head With Attitude Research, Proceedings of the 7th Annual Conference, American Marketing Association.

Jacoby, J., 1984, Perspectives on Information Overload, Journal of Consumer Research, 10 (March), pp. 432-435.

Jacoby, J. and J.C. Olson, 1977, Consumer Response to Price: An Attitudinal, Information Processing Perspective, in Wind Y. and M.G. Greenberg (ed.), 1977, Moving A Head With Attitude Research, Proceedings of the 7th Annual Conference of the American Marketing Association.

Jacoby, J., D.E. Speller and C.A. Kohn, 1974, Brand Choice Behavior as a function of Information Load, Journal of Marketing Research, 11 (February), pp. 63-69.

Jones, J.M. and F.S. Zufryden, 1982, An Approach for Assessing Demographic and Price Influences on Brand Purchase Behavior, Journal of Marketing, 46 (Winter), p. 36-46.

Judge, G.G., Griffiths, W.E., Hill, R.C. and T.C. Lee, 1980, The Theory and Practice of Econometrics, John Wiley and Sons.

Kamen, J. and R. Toman, 1970, Psychophysics of Prices, Journal of Marketing Research, 7, pp. 27-35.

Kapteyn, A., 1977, A Theory of Preference Formation, Pasmans, 's-Gravenhage.

Kasper, J.A.P. en A.A.A. Kuylen, 1984, The Index of Consumer Sentiment - Another Look at the Data and Some Methodological Improvements - Some First Results, EMAC/ESOMAR Symposium on Methodological Advances in Marketing Research in Theory and Practice, Kopenhagen.

Katona, G., 1960, The Powerful Consumer, McGraw-Hill, New York.

Keynes, J.M., 1936, The General Theory of Employment Interest and Money, Harcourt, Brace and Company, New York.

Klein, L.R. and H. Rubin, 1947-48, A Constant Utility Index of the Cost of Living, Review of Economic Studies, 15, pp. 84-87.

Kleyngeld, H.P., 1971, Adoption of New Food Products, Tilburg University Press, Nijgh-Wolters-Noordhoff Universitaire Uitgevers B.V., Rotterdam.

Koyck, L.M., 1954, Distributed Lags and Investment Analysis, North-Holland Publishing Company, Amsterdam.

Kuehn, A.A., 1961, A Model for Budgeting Advertising, in: Bass F.M., a.o. (ed.) 1961, Mathematical Models and Methods in

Marketing, Richard D. Irwin Inc., Homewood, Ill.

Ladd, G.W., 1982, Survey of Promising Developments in Demand Analysis: Economics of Product Characteristics in Rausser G.C. (ed.), 1982, New Directions in Econometric Modeling and Forecasting in U.S. Agriculture, North-Holland, New York, pp. 17-55.

Lambert, Z.V., 1977, Nutrition Information: A Look at Some Processing and Decision Making Difficulties, in: Wilkie, W. (ed.), Advances in Consumer Research 1977, pp. 126-132.

Lancaster, K.L., 1966, A New Approach to Consumer Theory, Journal of Political Economy, 74, pp. 132-157.

Lancaster, K.L., 1971, Consumer Demand: A New Approach, Columbia University Press, New York

Lancaster, K.L., 1979, Variety, Equity and Efficiency, Columbia Studies in Economics 10, Columbia University Press, New York.

Lee, T.C., G.G. Judge and A. Zellner, 1970, Estimating the Parameters of the Markov Probability Model from Aggregate Time Series Data, North-Holland Publishing Company, Amsterdam.

Levin, I.P. and R.D. Johnson, 1984, Estimating Price-Quality Tradeoffs Using Comparative Judgments, Journal of Consumer Research 11 (June), pp. 593-600.

Lilien, G.L., 1974, A Modified Linear Learning Model of Buyer Behavior, Management Science, 20, pp. 1027-1036.

Lilien, G.L. and P. Kotler, 1983, Marketing Decision Making: A Model Building Approach, Harper and Row, New York.

Lynch, Jr., J.G., 1985, Uniqueness Issues in the Decompositional Modeling of Multiattribute Overall Evaluation: An Information Integration Perspective, Journal of Marketing Research, 22 (February), pp. 1-19.

Mahajan, V. and E. Muller, 1979, Innovation Diffusion and New Product Growth Models, Journal of Marketing, 43 (Fall), pp. 55-58.

Malhotra, N.K., Jain, A.K. and S.W. Lagakos, 1982, The Information Overload Controversy: An Alternative Viewpoint, Journal of Marketing, 46 (Spring), pp. 27-37.

Markin, R.J., 1969, The Psychology of Consumer Behavior, Prentice Hall, Inc., Englewood Cliffs (Mass.).

Massy, W.F., D.B. Montgomery and D.G. Morrison, 1970, Stochastic Models of Buying Behavior, M.I.T. Press, Cambridge, Massachusetts.

- McCann, J.M. and D.J. Reibstein, 1985, Forecasting the Impact of Socioeconomic and Demographic Change on Product Demand, Journal of Marketing Research, 22 (November), pp. 415-423.
- McFarquhar, A.M.M. (ed.), 1971, Europe's Future Food and Agriculture, North-Holland Publishing Company, Amsterdam.
- Ministry of Agriculture Fisheries, and Food, 19.., Household Food Consumption and Expenditure ... Annual Report of the National Food Survey Committee, London.
- Modigliani, F. and R.E. Brumberg, 1954, Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data, in Kurihara K.K. (ed.), 1954, Post Keynesian Economics, New Brunswick (N.J.).
- Modigliani, F. and A. Ando, 1960, The 'Permanent Income' and the 'Life Cycle' Hypotheses of Saving Behavior: Comparison and Tests, in Friend J. and R. Jones (ed.), Proceedings of the Conference on Consumption and Saving, Vol. 2, Philadelphia.
- Makridakis, S., Wheelwright, S.C. and V.E. McGee, 1983, 2nd ed., Forecasting: Methods and Application, John Wiley and Sons, New York.
- Naert, P.A. and P.S.H. Leeflang, 1978, Building Implementable Marketing Models, Martinus Nijhoff Social Sciences Division, Leiden.
- Nerlove, M., 1956, Estimates of the Elasticities of Supply of Selected Agricultural Commodities, Journal of Farm Economics, 38, pp. 496-509.
- Nerlove, M., 1958, Distributed Lags and Demand Analysis, Agriculture Handbook no. 141, U.S.D.A., Washington D.C.
- Neslin, S.A. and R.W. Shoemaker, 1983, Using a Natural Experiment to Estimate Price Elasticity: The 1974 Sugar Shortage and the Ready-to-Eat Cereal Market, Journal of Marketing 47 (winter), pp. 44-57.
- Nicosia, F.M., 1966, Consumer Decision Processes: Marketing and Advertising Implications, Prentice Hall, Englewood, Cliffs (N.J.).
- Nicosia, F.M. and R.N. Mayer, 1976, Toward a Sociology of Consumption, Journal of Consumer Research, 3 (September), pp. 65-75.
- N.N., 1985, Consumptiepatroon Duitsers in 2000 gelijk, Foodpress, Nieuws 24-10-85, p. 3.
- Parfitt, J.H. and B.J.K. Collins, 1968, Use of Consumer Panels for Brand Share Prediction, Journal of Marketing Research, 2 (May), pp. 131-146.

- Phlips, L. 1974, Applied Consumption Analysis, North Holland Publishing Company, Amsterdam.
- Pollak, R.A., 1970, Habit Formation and Dynamic Demand Functions, Journal of Political Economy 78, pp. 745-763.
- Pollak, R.A., 1976, Interdependent Preferences, American Economic Review, 66, pp. 309-320.
- Praag, B.M.S. van, 1968, Individual Welfare Functions and Consumer Behaviour, North-Holland Publishing Company, Amsterdam.
- Praag, B.M.S. van, 1971, The Welfare Function of Income in Belgium: An Empirical Investigation, European Economic Review.
- Praag, B.M.S. van, 1985, Linking Economics with Psychology, An Economists View, Journal of Economic Psychology 6, 289-311.
- Praet, P., 1985, Endogenizing Consumers' Expectations In Four Major EC Countries, Journal of Economic Psychology, 6, pp. 255-269.
- Prais, S.J. and H.S. Houthakker, 1955, The Analysis of Family Budgets, Cambridge University, Cambridge.
- Price, D.W., West, D.A., Scheier, G.E. and D.Z. Price, 1978, Food Delivery Programs and Other Factors Affecting Nutrient Intake of Children, American Journal of Agricultural Economics, 60, pp. 402-415.
- Raay, van, F., 1977, Consumer Behavior: An Information-Processing Approach, Dissertatie Katholieke Hogeschool Tilburg.
- Ratchford, B.T., 1975, The New Economic Theory of Consumer Behaviour: An Interpretative Essay, Journal of Consumer Research, 2 (September), pp. 65-75.
- Ratchford, B.T., 1979, Operationalizing Economic Models of Demand for Product Characteristics, Journal of Consumer Research, 6 (June), pp. 76-85.
- Rogers, E., 1962, Diffusion of Innovations, The Free Press, Glencoe (Ill).
- Salathe, L.E. and R.C. Buse, 1979, Household Food Consumption Pattern in the United States, U.S.D.A. Technical Bulletin Number 1587, Washington, D.C.
- Schmittlein, D.C., A.C. Bemmaor and D.G. Morrison, 1985, Why Does the N.B.D. Model Work? Robustness in Representing Product Purchases, Brand Purchases and Imperfectly Recorded Purchases, Management Science 4 (3), pp. 255-266.
- Schoot, J.C.M. and W.J. Beek (red.), 1985, De Toekomst van onze

Voedingsmiddelenindustrie, Elsevier, Amsterdam.

Schultz, H., 1938, The Theory and Measurement of Demand, Chicago University Press, Chicago.

Shapiro, H.T., 1972, The Index of Consumer Sentiment and Economic Forecasting, A Reappraisal, in Strümpel B., Morgan J.N. and E. Zahn (ed.), Human Behavior in Economic Affairs. Essays in the Honour of G. Katona, North-Holland, Amsterdam.

Silk, A.J. and G.L. Urban, 1978, Pretest Market Evaluation of New Packaged Goods: A Model and Measurement Methodology, Journal of Marketing Research 15 (May), pp. 171-191.

Simon, H., 1979, Dynamics of Price Elasticity and Brand Life Cycles: An Empirical Study, Journal of Marketing Research, 16 (4), pp. 439-452.

Smallwood, D. and J. Blaylock, 1981, Impact of Household Size and Income on Food Spending Patterns, U.S.D.A. Technical Bulletin Number 1650, Washington, D.C.

Smidts, A. and B. Wierenga, 1983, Het keuzegedrag van consumenten met betrekking tot vlees, in: Voordrachten lezingendag "De Slacht- en Vleeskwaliiteit van het Nederlandse Rund", 28 april 1983, I.V.O. Zeist.

Solow, R.M., 1960, On a Family of Lag Distribution, Econometrica 28, pp. 399-406.

Somermeyer, W.H. and R. Bannink, 1973, A Consumption-Savings Model and its Applications, North-Holland Publishing Company, Amsterdam.

Somermeyer, W.H. and A. Langhout, 1972, Shapes of Engel Curves and Demand Curves: Implications of the Expenditure Allocation Model, Applied to Dutch Data, European Economic Review, 3, pp. 351-386.

Steenkamp, J.B., Wierenga, B. and M. Meulenbergh, 1985, Quality Perception of Food Products, Proceedings of Annual Conference 1985 of the European Marketing Academy, Bielefeld, pp. 346-366.

Stone, R. a.o., 1954, The Measurement of Consumers' Expenditures and Behaviour in the United Kingdom, 1920-1938, Vol. 1, National Institute of Economic and Social Research, London.

Swamy, G. and H.P. Biswanger, 1983, Flexible Consumer Demand Systems and Linear Estimation: Food in India, American Journal of Agricultural Economics, 65 (4), pp. 675-684.

Termorshuizen, J., Meulenbergh, M. and B. Wierenga, 1986, Consumer Behavior in respect of milk in the Netherlands, European Review of Agricultural Economics (in press).

- Termorshuizen, J., 1982, Het Consumentengedrag Met Betrekking tot Melk, Dissertatie Landbouwhogeschool Wageningen.
- Theil, H., 1975, Theory and Measurement of Consumer Demand, Vol. 1, North Holland Publishing Company, Amsterdam.
- Theil, H., 1976, Theory and Measurement of Consumer Demand, Vol. 2, North Holland Publishing Company, Amsterdam.
- Tilburg, A. van, 1984, Consumer Choice of Cut Flowers and Pot Plants, Agricultural University, Wageningen, Papers 84-2, Wageningen.
- Uhl, J., 1970, Consumer Perception of Retail Food Price Changes, Paper presented at the First Annual Meeting of the Association for Consumer Research, Amherst (Mass.).
- Urban, G.L. and J.R. Hauser, 1980, Design and Marketing of New Products, Prentice Hall Inc., Englewood Cliffs, New Jersey.
- Veldkamp Marktonderzoek B.V., 1985, Koop- en Bestedingsgedrag Etnische Groepen Band 2, Ministerie van Economische Zaken, Bureau Informatie, 's-Gravenhage.
- Viaene, J., 1978, Analyse van de Vraag naar Voedingsmiddelen Gebaseerd op Paneldata in België, Proefschrift Rijksuniversiteit Gent.
- Wold, H. and L. Jureen, 1953, Demand Analysis, John Wiley, New York.
- Werner, J., 1982, Psychologische Marktsegmentierung beim Absatz von Äpfeln, Forschungsberichte zur Ökonomie im Gartenbau, Nr. 38, Hannover und Weihenstephan.
- Werner, J., 1982, Einstellungen zum Produkt und zum Produktbereich als Grundlage einer Konsumententypologie, Marketing, Zeitschrift für Forschung und Praxis, 4 (3), pp. 157-164.
- Wierenga, B., 1974, An Investigation of Brand Choice Processes, Universitaire Pers Rotterdam, Rotterdam.
- Wierenga, B., 1980, Multidimensional Models for the Analysis of Consumers' Perception and Preferences with Respect to Agricultural and Food Products, Journal of Agricultural Economics XXXI (1), January, pp. 83-97.
- Wierenga, B., 1984, Empirical Test of the Lancaster Characteristics Model, International Journal of Research in Marketing, 1 (4), pp. 263-294.
- Wind, Y.J., 1982, Product Policy: Concepts, Methods, and Strategy, Addison Wesley Publishing Company, Reading (Mass.).

Wöhken, E., 1981, Nahrungsmittelverbrauch im Mehrländervergleich, Schriftenreihe des Bundesministers für Ernährung, Landwirtschaft und Forsten, Heft 249, Landwirtschaftsverlag G.m.b.H., Münster-Hiltrup.

Woodside, A., Bearden, W.O. and J.D. Clokey, 1977, Effects of Consumption Situations and Multibrand Attitudes on Consumer Brand Choice, in: Wind Y. and M.G. Greenberg (ed.), Moving A Head With Attitude Research, Proceedings of the 7th Annual Conference, American American Association.