

# Consumer Behavior Research in the Advent of the 21st Century

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**Abstract.** *A short overview on consumer behavior research is provided followed by the evolvement of consumer behavior as a scientific discipline. Subsequently, research on consumer behavior towards food is discussed in greater detail whereby extensive reference is made to the progress of food consumption behavior towards a scientific discipline. It is argued that agricultural economists are beginning to establish this new research field and are well suited to do so. The field of consumer behavior towards food has to integrate physical sciences, psychology, economic sciences and social sciences. The research agenda for food consumption research is sketched and promising points are commented upon.*

**Keywords:** agent modeling, decision networks, food consumption behavior, house of quality, quality function deployment, scientific discipline

## 1. Introduction

Increased interest in the demand of food is due to many reasons. Prior to 1992, the demand for many agricultural products was determined mainly by the Common Agricultural Policy (CAP). The intervention agencies and their policy influenced the demand for agricultural products, with the world market as the dumping place for surpluses. With the reform of the Common Agricultural Policy in 1992, the consumer demand for agricultural products became more important for the supply.

With an increasing economic well-being and a decreasing share of consumer income devoted to food consumption there has been an increasing interest in the quality of the products. Quality management systems which focus on consumer needs have received increasing interest from agricultural economists.

The public led demand of the intervention stores was mainly interested in quantity, while the consumer is mainly interested in quality. While quantity might be important for world markets, quality is crucial for the domestic market. With the ongoing reform of the CAP consumer demand has gained increasing importance, while the public or policy driven demand has diminished.

Seminars of the European Association of Agricultural Economists have a tradition dating back to 1980, with the first seminar taking place in Zaragoza. From their very beginning, these seminars have taken an agribusiness orientation.

The first seminar addressing consumers explicitly in the title took place in 1989 in Montpellier with the title "Producers and Consumers versus Agricultural and Food Policy in Africa". In 1996 there was another seminar focusing on consumers organized in Wageningen with the title "Agricultural Marketing and Consumer Behavior in a Changing World". Furthermore, in 1999, in Halle a seminar entitled "Analysis of Food Consumption in Central and Eastern Europe: Relevance and Empirical Methods" was presented. In 2001, Zaragoza once again took the lead and organized a seminar whose main focus was the consumer bearing the title: "The food consumer in the Early 21<sup>st</sup> Century". With very few exceptions, all of the 39 contributed papers and the 21 posters in this seminar focused on the consumer.

While the consumer focus is gradually integrated in agricultural economic research, an established research has already been conducted on consumer behavior with cursory investigation of food consumption. First, a short overview on the development of consumer behavior as a scientific discipline will be presented. In the second part of the presentation, the peculiarities of food consumption will be

referred to and an overview on the research approaches employed in analyzing food consumption will be given. The state of art in food consumption analysis is sketched. Organizational suggestions for unifying and improving this field of research are given. In the third part a possible research agenda for this evolving research area will be provided. Some possible routes attributing to the development of this research to further to fit the peculiarities of food consumption will be referred to. The outlook of the philosophical implication of these possible routes of future research within the realms of food consumption behavior will be discussed.

## 2. Consumer behavior as a scientific discipline

The consumer behavior field has evolved in the last half century and its focus has changed. Robertson and Kassirjian<sup>[1]</sup>, the editors of the Handbook of Consumer Behavior trace back the initial foundations of research in the field of consumer behavior research to economics and motivation research.

Consumer behavior research established itself as a separate scientific discipline in the 1960's. The first books in this area were published in 1967 (Myers, and Reynolds<sup>[2]</sup>) and 1968 (Engel, Kollat and Blackwell<sup>[3]</sup>). Up to this time, the research conducted on consumer behavior made up a part of the research in the area of applied psychology and social-economics behavior (Kroeber-Riel and Weinberg, 1996, p.4<sup>[4]</sup>). In the meantime several textbooks covering consumer behavior are available.<sup>1</sup>

The empirical oriented marketing research took over in particular the applied psychology approach in its initial and current stages. The socio-economic approach has further contributed to the area of economic psychology,<sup>2</sup> but traditional textbooks on consumer behavior still have their focus on the marketing aspect and are mainly influenced by psychological oriented research including research on cognition, learning and motivation. But rather recently there have been other approaches available incorporating biological, sociological and anthropological theories (Desmond, 2003<sup>[7]</sup>).

In 1969, a group of interested researchers meeting informally at the Ohio State University decided that an organization composed of those interested in consumer behavior research was necessary to advance and disseminate knowledge in this field. The Association for Consumer Research (ACR) was founded. In 1970, the first conference was held, and annual conferences have been held since that time. ACR has approximately 1700 members. In 2003, a European Conference was held in Dublin and a North American Conference held in Toronto.

Food consumption is covered to some extent within this association. In the 2002 conference in Atlanta, some, but very few, of the presented papers were on food consumption. In the 2003 European conference, there was a session devoted to food consumption where four papers were presented. This is very little coverage of the issue compared with the 10<sup>th</sup> conference of the European Association of Agricultural Economists in 2003 in Zaragoza, or with the EAAE seminars. Research on food consumption seems to be much more active within the European Association of Agricultural Economists than within the Association for Consumer Research.

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<sup>1</sup> Among the more traditional textbooks those of Peter, Olson and Grunert (1999)<sup>[5]</sup> and East (1997)<sup>[6]</sup> are my favorites. While these textbooks are of psychological orientation, the textbook by Desmond (2003)<sup>[7]</sup> takes another very interesting approach to incorporating biological, sociological and anthropological theories.

<sup>2</sup> The socio-economic approach can be characterized by the aims of the "Journal of Economic Psychology": "The Journal aims to present research that will improve understanding of behavioral, especially socio-psychological, aspects of economic phenomena and processes. The Journal seeks to be a channel for the increased interest in using behavioral science methods for the study of economic behavior, and for the contribution to better solutions of societal problems, by stimulating new approaches and new theories regarding economic affairs. Economic psychology as a discipline studies the psychological mechanisms that underlie consumption and other economic behavior. It deals with preferences, choices, decisions, and factors influencing these, as well as the consequences of decisions and choices with respect to the satisfaction of needs. This includes the impact of external economic phenomena upon human behavior and well-being. Studies in economic psychology may relate to different levels of aggregation, from the household and the individual consumer to the macro level of whole nations. Economic behavior in connection with inflation, unemployment, taxation, economic development, as well as consumer information and economic behavior in the market place are thus the major fields of interest."

### 3. Food consumption behavior as a scientific discipline

It seems that agricultural economists are very active in the area of food consumption behavior research. But a lot can be learned from those disciplines which have been involved in consumer behavior research for a long time.

At first sight, it might be questionable to segregate food consumption behavior from the general consumer behavior research. Is food consumption not just the consumption of a particular product? What makes food consumption so special?

Food consumption is unique due to the following reasons:

- Food is ingested.
- Many other products are used by consumers, like cars, technical equipment etc. but food is consumed.
- Food consumption is a necessity for survival (a “Lebensmittel”).
- Food consumption is as old as mankind.
- Not only does mankind rely on food but so do animals.

The research on consumer behavior towards food is spread among a lot of various disciplines. The peculiarity of food consumption is reflected in the different scientific disciplines involved in food consumption research. Food is ingested and the body can not exist without food. Accordingly there is a link between research on food consumption and research on diseases and disorders undertaken in medicine, physiology and toxicology. Chemistry and physics are relevant for the research as well, in particular for sensory research, though this research already has established itself as a separate research field. Sensory research, nutrition and food technology are part of the “food sciences”. The distinction of food from other products is reflected in the scientific disciplines subsumed under “food sciences”.

Psychology is not only important as a scientific discipline for the analysis of food consumption behavior in particular but of consumer behavior in general, as already mentioned. The same holds for all the economic sciences involved in research on food consumption.

Economists are generally not aware of the research undertaken in anthropology and history on food consumption. On the other hand, the research conducted in the fields of social sciences and psychology does not account for economic oriented research. The “International Multidisciplinary Conferences on Food Choice” may serve as an example that there is a large “knowledge wall” separating economics from psychology and the social sciences. This series of conferences is arranged under the auspices of the international Scientific Unions and Food Commissions (<http://www.sne.org>, 01.09.2003) consisting of the following scientific disciplines:

Anthropology and Ethnographic Sciences: Anthropology of Food;

Physiological Sciences: Physiology of Food and Fluid Intake;

Applied Psychology: Psychology of Food and Nutrition;

Psychological Sciences;

Nutritional Sciences: Nutrition and Food Habits and Choices;

Sociology of Diet, Food and Nutrition.

Economics is missing.

The first conference of these series of “International Multidisciplinary Conferences on Food Choice” took place in 1993. In 2003, the eleventh conference, hosted by the Society for Nutrition Research took place in July in Philadelphia. It is time for the wall between economics on the one hand and psychology and the social sciences on the other, to come down.

In contrast, the Joint Annual Meetings of the “Agriculture, Food and Human Values Society (AFHVS)” and the “Association for the Study of Food and Society (ASFS)” which commenced in 1992, explicitly include the economic sciences.

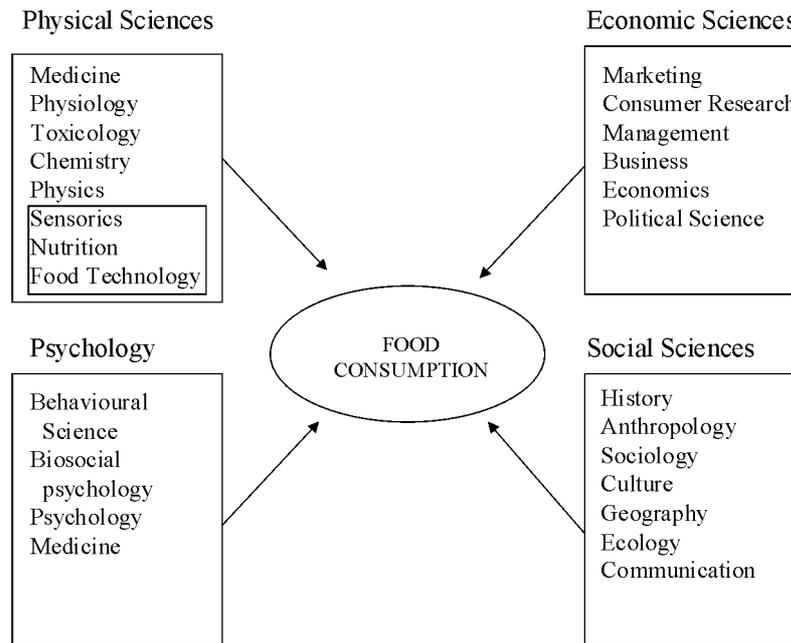


Figure 1. Scientific Disciplines involved in research on food consumption\*

Agricultural economists, with their interdisciplinary approach, are particularly suited to take over the lead in the area of food consumer behavior, and have done this already to some extent. As already mentioned, the coverage of food consumption behavior is rather minor in the conferences of the Association of Consumer Research compared to the conferences of the European Association of Agricultural Economists. This becomes obvious when looking at the contributions to the last conferences.

A search for articles on “food consumer/consumption behavior” in journal article databanks, like ingenta (<http://www.ingentaconnect.com>) indicates that the coverage of food consumption in the consumer behavior journals like:

- Journal of Consumer Behavior,
- Journal of Consumer Research,
- Journal of Consumer Policy,
- Journal of Consumer Culture,
- Journal of Consumer Affairs,
- Journal of Consumer Marketing,
- Journal of Consumer Psychology,
- Journal of Economic Psychology,
- Consumption, Markets and Culture,
- Consumer Policy Review,
- International Journal of Consumer Studies,
- Advances of Consumer Research
- Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior
- Consumer Product Safety Research

is rather minor, compared to more agricultural oriented journals, like:

- European Review of Agricultural Economics
- American Journal of Agricultural Economics.

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\* own compilation

But, the most prominent journals in this area seem to be:

- British Food Journal
- Food Quality and Preference
- Appetite.

It is natural for the researchers in a new evolving scientific discipline, like food consumption behavior, to publish their research in the journals of the parent discipline, in our case agricultural economics. With a growing number of researchers in this new field, the need for a specialized journal emerges. The impression acquired is, that this specialized journal is already available. If one conducts a search in a databank, like ingenta, on articles about food consumer behavior, the most frequent journal coming up is the

- British Food Journal.

A new evolving discipline does not need only journals, but textbooks as well. According to my experience there is already one excellent textbook available covering the area of physical sciences in food consumption behavior in all its interdisciplinarity:

- Meiselman, H.L. and MacFie, H.J.H. (Editors): Food choice, acceptance and consumption. <sup>[8]</sup>

There are other books available which are helpful for teaching food consumption behavior from an economic perspective, like

- Marshall, D.W. (Editor): Food Choice and the Consumer. <sup>[9]</sup>

Which is more oriented towards the European needs and better suited than, for example:

- Senauer, B., Asp, E. and Kinsey, J.: Food Trends and the Changing Consumer. <sup>[10]</sup>

A good aid in preparing courses on food consumption behavior with an excellent, though somehow outdated coverage of consumer theory in general is:

- Roth, T.R.: The Present State of Consumer Theory. <sup>[11]</sup>

A good introduction in the psychological oriented research is given by:

- Logue, A.W.: The psychology of eating and drinking. <sup>[12]</sup>

A good introduction into the social sciences approach is:

- Warde, A.: Consumption, food and taste. <sup>[13]</sup>

or

- Lupton, D.: Food, the body and the self. <sup>[14]</sup>

The Cambridge World History of Food (Kiple and Ornelas 2000 <sup>[15]</sup>) covers many aspects with a focus on the historical and cultural aspects.

A recent textbook covering a broad and interdisciplinary range of issues is:

- Frewer, L., Risvik, E. and Schifferstein, H. (Editors): Food, People and Society: A European perspective of consumers' food choice. <sup>[16]</sup>

It is interesting to note, that the social science perspective is beginning to influence, under the heading "postmodern perspective", even the traditional consumer behavior research. This has broadened the consumer behavior approach pursued in the marketing oriented literature. The focus is no longer only on influencing consumption behavior but on understanding consumption behavior. This broadened perspective has led to a recent growth in published research on such aspects as consumption experience as sensation seeking, emotional arousal and fantasizing. As Engel et al. (1995, p. 8) <sup>[17]</sup> put it: "Methodology has moved beyond positivism to such diverse options as ethnography, semiotics, hermeneutics, literary criticism, and historicism to achieve a broader understanding of the impact of consumption on all aspects of life." In the context of food consumption behavior the many meanings of food are investigated. Among these are the following which have been based on interviews with students and faculty of various ethnic and cultural backgrounds in the United States of America (Guion et al. 2002 <sup>[18]</sup>):

- construction of identity
- functioning as a vehicle to create and maintain cultural capital
- creation of social identity
- functioning as a marker of ethnic and regional identity.

In Europe one should also add:

- pursuance and reaffirmation of ethical goals.

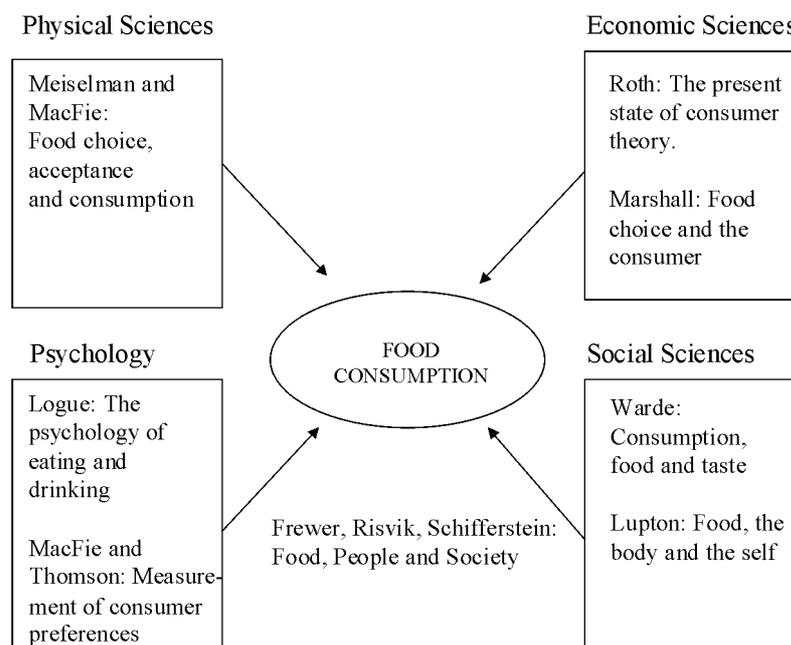


Figure 2. Textbooks for the new evolving scientific discipline: food consumption behavior\*

#### 4. A research agenda for food consumption research

The focus of agricultural economists is on supply, demand and public policy. In agricultural economics the focus of research has broadened in the last decades from the agricultural sector and the agricultural policy to the whole food supply chain and the agricultural and food policy. This horizontal extension of the research object of agricultural economists makes them particularly suited to investigate consumer behavior without neglecting the supply side.

Food consumption analysis provides many opportunities for interdisciplinary research. As already mentioned, agricultural economists are particularly suited to conduct research in the area of food consumption analysis due to their interdisciplinary approach. But, in this case it is believed that, in this respect, agricultural economists working on food consumption could improve their research by integrating the physical sciences in their research. In this respect, the European Commission will give a great impetus to conduct interdisciplinary research with the 6<sup>th</sup> Framework Programme.

Agricultural economists are generally inclined to employ quantitative methods and are skeptical about qualitative methods. Among agricultural economists econometric methods are the most prominent methodical research tools. In the area of food consumption research qualitative research methods like focus group interviews and means-end chain analysis are increasingly used as a methodological research tool. The social sciences are offering other methodological tools, which could be helpful in analyzing food consumption behavior.

But a new research area not only needs methodological tools, but theoretical tools as well. At best, these two toolboxes are compatible with each other. Furthermore, empirical oriented research needs empirical data. Theory, method and data constitute the magic triangle of empirical research.

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\* own compilation

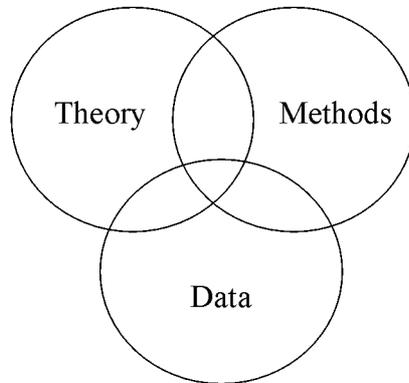


Figure 3: The magic triangle for empirical research\*

The traditional economic theory offers some theoretical approaches for analyzing food consumption behavior. The most prominent approach is the demand system approach. This approach is regarded as being not well suited to analyze food consumption behavior. The most important economic approaches to analyze food consumption are the household production approach, connected with the name of Gary S. Becker, and the product characteristics approach, connected with the name of Kelvin Lancaster. The potential of the household production approach and the product characteristics approach for investigating and analyzing food consumption behavior is immense and has not yet been realized among agricultural economists. It is amazing, that these approaches have encountered, compared to the demand system approach, such minimal interest among agricultural economists working on food consumption behavior.

According to my view of the research agenda for food consumption behavior, it is not sufficient to use only traditional economic theoretical approaches or the traditional theoretical approaches available from the social sciences. Of course, research in a new area and on a new object has to start with transferring and adapting approaches available in other research areas for the specific needs of the new research area and object. This is a very important task for every day research. My impression is, that the traditional theories and methods available in the economic sciences and the social sciences may guide us a long way on our path to cognition (Erkenntnis (German), Episteme (Greek)) regarding food consumption behavior but that there is a growing need for a theoretical framework integrating all the sciences involved in analyzing food consumption behavior.

There is no such general theoretical framework in sight, though there are some promising starting points. At this point, two, which are regarded as useful for practical every day research in this area, will be sketched out.

A promising framework for linking the physical science approach to the economic approach is the quality guidance approach (Steenkamp and van Trijp 1996<sup>[19]</sup>) respective the quality function deployment or house of quality approach<sup>3</sup>. These approaches will not be covered in detail here, because good introductory and easy accessible literature is available. These approaches are regarded as promising not only for the development of new products but also for investigating food consumer behavior in an interdisciplinary framework.

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\* own graphic

<sup>3</sup> In the context of food refer to Bech, Hansen and Wienberg (1997)<sup>[20]</sup> and for a general up-to-date overview refer to Akao and Mazur (2003)<sup>[21]</sup>.

Here a short outline will be provided for another approach. Integrating psychology, social sciences and economic sciences is regarded as highly feasible. The term “agent approach” will be employed to characterize this approach.

The social and economic sciences and psychology are interested in the decision making of human beings. Either the focus is on individual decision making, as in economic decision theory or psychology, or on interactive decision making, as in game theory, sociology and other social sciences. It is not the aim of research to spell out all determinants of decision making, but the most important for the behavior of humans. The focal point of interest here is on food consumer behavior. These aspects of human beings can be referred to as the agent aspect and can accordingly be related to individual agent modeling and interactive agent modeling. Individual agent modeling focuses on modeling individual behavior and interactive agent modeling focuses on the interaction of economic agents.

The individual as well as interactive agent modeling is important for all the social and economic sciences including psychology. Economic theory and psychological theory give advice on how to model individual agent behavior. Economic theory and sociological theory provide advice on how to model the interaction of individual agents. Artificial intelligence supplies us with the methodical framework to embed our theory and to come up with a framework integrating psychology, economic sciences and social sciences.

There are several approaches available in Artificial Intelligence with the potential to be used in modeling consumer behavior. Consumer behavior may either be modeled as a decision network or as a neural network. There is no evidence available that an effort has been made in the literature to model consumer behavior with a decision network.

The neural network approach is more prominent. There are several articles available in the economic literature using this approach. In the finance literature in particular this approach is well established. The neural network approach has been used intensively in psychology and has been developed more extensively from an approach without psychological theory to an approach integrating psychological theory and empirical research. In psychology, this approach is known as Parallel Distributed Processing.

The multi-agent approach builds on the individual agent approach and offers the frame to link multiple agents together. The tools useful in this respect are offered by the theory of cellular automata. Multi-agent modeling, in contrast to decision networks, is very prominent not only in Artificial Intelligence<sup>4</sup>, but also in economics. Here, this area of research is often named Agent-Based Computational Economics (ACE). In recent years, multi-agent modeling has gained great interest. The topics addressed include (Tsfatsion 2002, p.3.<sup>[21]</sup>):

- Learning and the embodied mind<sup>5</sup>
- Evolution of behavioral norms
- Bottom-up modeling of market processes
- Formation of economic networks
- Modeling of organizations
- Design of computational agents for automated markets
- Parallel experiments with real and computational agent

While the individual agent framework fits the needs of psychology and economics, the multi agent framework can be of interest not only for economics but also for the social sciences. In the future, many articles in the area of the social sciences employing and adapting this framework, will most likely be seen.

## 5. Outlook

So far, the topic of this presentation has concentrated on “Consumer Behavior Research in the Advent of the 21st Century”. Upon completion of this, the following question will be discussed: “How far will the agent modeling approach bring us?”. Suppose, the “Society of Food Consumption Agents” will hold a seminar in the year 3003 on “Food Quality Products in the Advent of the 31<sup>st</sup> Century: Production, Demand and Public Policy“.

Will it be possible in the next millennium to model human behavior based on the agent approach in such a perfect manner, that the agent and the human can be regarded as identical?

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<sup>4</sup> At least three of the papers presented at the meetings of the Eighteens International Joint Conference on Artificial Intelligence in 2003 have, according to the title, their focus on multi-agent modeling.

<sup>5</sup> The embodied-mind approach can be characterized as the view that evolution typically results less from cognitive processes than from various forms of imitation, such as those underlying cultural transmission (Tsfatsion 2002, p. 4<sup>[22]</sup>).

Many leading researchers in the field of Artificial Intelligence, like Minsky, Hofstadter, Fodor and Moravec would claim, that this is, in principle, possible.<sup>6</sup> Moravec, one of these followers of so called “Strong Artificial Intelligence”, brings this to the point (Moravec, 1990, p. 162<sup>[24]</sup>). He distinguishes between a body identity and a structural identity. The body identity defines the human by the physical body, while the structural identity defines the human being by the structure or the processes which take place within the body. If one is inclined to believe in a structural identity, like Moravec, a transmitter of persons, like the one used in science fictions like “Starwars”, will be possible in principle. This person transmitter will work like a copy machine. The information on the structure and process is transmitted and the human being is built up from atoms and molecules available at the destination. The identity is defined by the structure or process, not by the physical body, in which these processes takes place. If this structure or process is preserved, the identity is preserved. The rest is brawn or jelly. The body is regarded as a kind of hardware and the structure or process as a kind of software.

This is an interesting topic to discuss, but for our purpose we must not go that far. It suffices, if it is not possible to distinguish between the agent model and the human being. Or put in the form of a question: Will it be possible in the next millennium to model human behavior based on the agent approach in such a perfect manner, that you can find no difference between them?

In order to answer this question, the so called “Chinese Room” will be introduced. Imagine a person is in the position of the agent and he/she is sitting in a room. One will receive an input, that the person does not understand, because it is in Chinese and will then have to answer to this input producing output in Chinese. The person is assumed to be unable to speak or understand Chinese, but has a large table of prescriptions telling him/her which output to choose from in order to respond to a particular input. The person outside of the “Chinese Room” giving the questions as input and receiving the output, will get the impression, that the respondent speaks perfect Chinese. Thus, the agent is possibly a very complicated algorithm. Even if the hypothesis of the “Strong Artificial Intelligence” does not hold, it may be possible to build an agent such that one is not able to distinguish between the behavior of the agent and the behavior of the human being.

However it is doubtful that this will be possible for the following three reasons:

The agent in the “Chinese Room” has to have consistent and not contradicting prescriptions on how to react to a particular input. Human beings are not consistent and often act in a contradicting manner.

Human beings reflect what they do. Reflecting is the precondition for consciousness. If one reflects upon what one does in response to an input, the person may react differently in the future. Unless an algorithm for consciousness is found, it will not be possible to simulate human behavior in a perfect manner.

The third argument rests on the difference between emotions and intellect. It is possible to simulate emotions using the intellect. This is demonstrated by the agent models employed in psychology. It may be taken so far as to assume, that it will be possible to simulate emotions such that no difference will be found between simulation and human behavior. Though I am of the opinion, that emotions may be simulated, they are not fully under the control of the intellect. Unless human beings are fully in control of their emotions, the intellectual modeling of emotions will not always be a perfect model of human emotions.

## 6. Conclusions

Agricultural economists seem to have taken the lead in the advancement of research on “food consumption behavior”. Scientific legitimation and several available indications support, that the research on food consumption behavior may establish itself as a new interdisciplinary research discipline. The methods offered by Artificial Intelligence seem to be promising for adopting, adapting and developing food consumption behavior research. But models will remain models, even until the end of the next millennium.

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<sup>6</sup> Compare Penrose (1991) p.27. <sup>[23]</sup>

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