

Part 1B

*From raw materials to consumer:
aspects of dietary behavior*

chapter seven

Aspects of dietary behavior

P. van Assema and G.J. Kok

- 7.1 Introduction
 - 7.2 Behavior and its determinants
 - 7.3 Models of behavioral determinants
 - 7.4 Studies on determinants of dietary behavior
 - 7.5 Summary
- Reference and reading list

7.1 Introduction

Part 1 dealt with the route of food (components) from raw material to the consumer. The relationship between the origin of food and exposure to it or its components has been discussed from chemical, microbiological, and technological points of view. Whether the consumer is ultimately exposed to food (components) or not depends on his dietary behavior. This chapter looks at dietary behavior and its determinants.

7.2 Behavior and its determinants

The concept of dietary behavior is very complex. Dietary behavior includes a multitude of behaviors and can refer to:

- food choice (e.g., buying skimmed milk instead of full cream milk in the supermarket);
- food preparation (e.g., frying an egg in margarine);
- food preservation (e.g., keeping raw meat in the refrigerator);
- (actual) food consumption.

Attempts have long been made to change certain dietary behaviors of the population for reasons of health. These nutritional interventions are aimed at groups of patients, high-risk groups, healthy people, or intermediaries such as people working in the kitchen of a restaurant.

The complexity of dietary behavior can also be illustrated by the diversity of the objectives of nutritional interventions such as:

- increasing the hygienic behavior in the catering industry;
- reducing the consumption of proteins and sodium by kidney patients to relieve the kidney(s) as much as possible;

- reducing the total energy intake to prevent or cure obesity;
- increasing the consumption of food products containing carbohydrates to improve achievements in endurance sports;
- increasing the knowledge about food preservation to prevent food poisoning, for example, resulting from microbial contamination;
- reducing alcohol consumption to decrease the number of alcohol-related traffic accidents.

In order to change dietary behavior it is important to know the factors that determine it. Why do people display a certain dietary behavior? Once the behavioral determinants have been established, specific nutritional interventions can be chosen (see further Part 3, [Chapter 22](#)). Dietary behavior, like behavior in general, is determined by many factors, in this case for example, availability of food, food policy of the government, social environment, advertising, and experience and opinions people have regarding food safety. These are all factors, either at the macrolevel (systemic) or at the microlevel (individual), which influence people's food choices, how they prepare their food, and how they preserve it. To make matters even more complex, the determinants of all specific behaviors have to be studied one by one. The reasons why a healthy person eats two oranges a day are completely different from those of an overweight person to eat low-fat cheese. Moreover, the determinants of a specific behavior can also vary from person to person.

The following sections deal with theories on factors determining dietary behavior. Also, some studies on the determinants of specific dietary behaviors will be discussed, to give an idea of the state of the art in this field. Point of departure is that a person's cultural environment is the dominating determining factor of his or her dietary behavior. Much information on someone's dietary habits is already available if the country of origin of that person is known. However, within cultures there are many differences in food choices. The key question is which factors determine the differences.

7.3 *Models of behavioral determinants*

Behavior in general can be explained at the macro- as well as the microlevel. Factors affecting dietary behavior at the macrolevel can be policy, advertising, availability and acceptability of products, and cultural standards and values. Theoretical models at the macrolevel which might be helpful in studying (dietary) behaviors are scarce. Moreover, they are very abstract and lack empirical support. Often, there are complex multicausal relationships between the variables in these models. On the other hand, if one wants to explain behavior at the microlevel, there are often empirical theories available with operational, quantifiable (often one-to-one) relationships. Therefore, this chapter is restricted to theories at the microlevel in which individual behavior is the dependent variable. However, factors at the macrolevel are also considered to be important prerequisites, so behavioral change interventions should also focus on them (see Part 3, [Chapter 22](#)).

Social psychologists and health education researchers have developed models for explaining individual behavior in general, i.e., health behavior, environmental (hygiene) behavior, political choices, etc. Extreme anxiety behavior or addictive behavior, however, can not be explained with these models. The majority of dietary behaviors, which are important from a health point of view, can be explained. A prerequisite for using the models is that the behavior that has to be explained is under a person's control and that the person is aware of the options. This does not mean though that people always have to be completely conscious of these behavioral choices. Many of them are made implicitly, especially those which have become habits.

For the various models, three main groups of determinants can be distinguished:

- attitude (what do people think of their behavior themselves?)
- social influence (what is the role of the social environment?)
- possibilities (either internal or external to the person) for displaying behavior.

Often, there is an overlap between the three groups.

An *attitude* towards a specific behavior reflects whether a person's general feelings are favorable or unfavorable towards that behavior, and is determined by the evaluation of all pros and cons of the behavior. It should be noted that this concerns the *perceived* positive and negative consequences of the behavior, and not necessarily the *actual* consequences. For example, a person may think that canned vegetables contain many additives. Although this does not need to be so, it still affects the person's attitude towards buying and eating the vegetables. For many, the evaluation of the health implications of a behavior is important. It is questionable, however, whether people's behavior is indeed determined by its health consequences. Some people do not eat butter, as they think it is unhealthy. On the other hand, there are also people who do not eat it because they do not like it. In general, health implications often play a role in behavioral choice, although sometimes a very marginal one.

Besides health consequences, there are other consequences which can influence someone's attitude towards a behavior. As already suggested, these are sometimes more important than the health aspects. Think of taste (raw meat may taste good), or practical considerations (it may be too much bother to remove burned parts of grilled meat). Also, considerations related to social environment may be important: eating fruit may give the image of a health fanatic. In short, many positive and negative aspects of both the desired behavior and the risk behavior play a role in behavior.

The attitude model designed by Fishbein and Ajzen (1975) is based on the assumption that people have reasons for their behavior. These reasons, however, are not necessarily rational. On the contrary, according to experts, people may have very irrational reasons for behavior, which are valid in their own conception. The model does not predict behavior effectively when people are not aware of their actual motives for behavior.

Before the other two main groups of behavioral determinants, i.e., social influence and possibilities are addressed, measurement of attitudes will be described below.

Intermezzo

Measuring attitudes. Many authors have reported on the measurement of attitudes. According to Fishbein and Ajzen (1975), a person's attitude may be measured directly by one single question, e.g., "Is this behavior good or bad?" Also, the structure of the attitude may be analyzed. In other words, the specific pros and cons the behavior is connected with, may be identified. To determine this structure, people may be asked to point out which consequences they believe the behavior is connected with (beliefs, *B*), using a scale ranging from extremely likely to extremely unlikely.

For example: eating two pieces of fruit a day reduces my chances of getting cancer. I think this is extremely likely/extremely unlikely, with some answers in between. Subsequently, the answers, for example, can be given marks ranging from 1 (extremely likely) to 0 (extremely unlikely).

It is also important to know whether the consequence is considered as an advantage or a disadvantage. These evaluations (*E*) can also be measured, for instance as follows. Reducing my chances of getting cancer is: very good/very bad, again with some intermediate answers. These can also be given a mark, for example from +3 (very good), via 0

(neutral) to -3 (very bad). Ultimately, the attitude can be expressed by multiplying the beliefs with the corresponding evaluations, followed by summation of the products thus obtained:

$$A = \sum_{i=1}^N B_i \times E_i$$

where A is the attitude, B the belief and E the corresponding evaluation.

The *social environment* very much affects behavior. This is especially so in dietary behaviors, as most of these are displayed in the presence of other people. The influence of the social environment is often underestimated. People are inclined to think that their behavior reflects their own attitudes, particularly if they can rationalize their behavior. This, however, has been shown to be a misunderstanding. Behavior is influenced very strongly by the social environment and the possibilities or impossibilities, sometimes so strongly that attitude has no influence at all. There are two kinds of social influence: direct and indirect. *Direct* influence refers to the clear expectations of others as to how someone should behave, e.g., an adolescent with his friends in a snackbar or drinking alcohol in company. In both situations, a certain kind of behavior is expected from the person. Not cooperating means not belonging or no longer belonging to the group of people the person belongs to or wants to belong to. *Indirect* influence is more subtle. It refers to modeling, imitating the behavior of others. Behavior is learned by observing others. This kind of social influence is called indirect, as the observed (the model) does not explicitly formulate expectations. For example, the model can be seen on film or television.

Most times, there is a relationship between the opinion of the social environment about a behavior and one's own attitude towards it. This is partly because people incorporate the opinion of the social environment into their own attitude. This is called "internalizing the opinion of the social environment." However, the relationship between attitude and social influence can also be absent. There are situations in which a person's attitude does not match the expectations of the social environment, as he or she functions in different social environments, for example at school, at a sports club, in the family. In such situations the person can behave as the environment expects, which means there is a discrepancy between the person's behavior and his or her own opinion. For example, someone may eat meat at an official dinner, while he/she actually dislikes meat.

Social psychology distinguishes two principles that explain the influence of the social environment: reward and information. The principle of *reward* is based on the basic learning process: if someone behaves in a way and expresses opinions that agree with the behavior and opinions of superiors, this is rewarded. It can yield social appreciation, status and respect. The principle of *information* implies that people want to have correct information. It does not concern actual correct information, but perceived correct information. The behavior and opinions of important others are considered to be a source of information, as long as this information agrees with the information a person already has.

Thus, the social environment affects people's behavior, as it gives rewards and is a source of information. It is clear that behavior that does not agree with one's own opinions is based on the principle of reward. On the other hand, the internalization of the opinion of the social environment is primarily based on the principle of information.

Information is supposed to influence all three groups of determinants, but not directly behavior. Information is often erroneously supposed to be the only or most important determinant of behavior. Information about nutrition and about the relationship between

a behavior and a health problem is a prerequisite, but rarely a motive for behavioral change.

The third, and sometimes very important, group of influencing factors are the *possibilities* or impossibilities of displaying a behavior. There is the example of dieticians who advised women to buy skimmed milk, while there was no such milk available in the small towns where the women lived. This is an example of an impossibility external to the person. Other examples are the unavailability of money or time and non-cooperative members of the family. Impossibilities for behavior can also be internal to the person, e.g., lack of information, skills, or perseverance.

Often, influences from the social environment and possibilities and impossibilities go together. For example, studies on weight loss show that in particular family members have a negative influence on long-term changes in dietary habits (by the principle of negative rewards) and that the people involved, in spite of their intentions, are often not able to stand up against this effectively.

Apart from the three main groups of determinants, factors such as age, education, and sex determine behavior. Their effects are indirect: through attitude, social influence, and possibilities/impossibilities. Physiological variables can also be considered external variables. Physiological processes underlie attitudinal considerations such as taste. Also, hunger can reduce the importance of certain negative consequences of a behavior. Another important external variable is habit. In general, people do what they are used to doing. Especially with regard to habitual behavior, the frequency of former behavior will predict future behavior. If the behavior in question is easy and does not need much consideration, habits will predict future behavior independent from the three main groups of determinants. Dietary behavior is often habitual. The attitude model is summarized in [Figure 7.1](#).

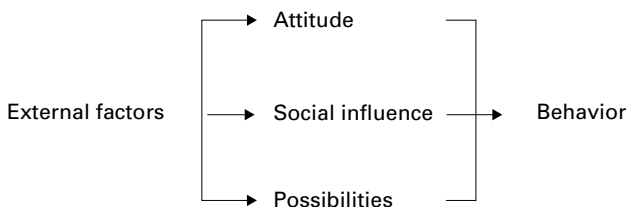


Figure 7.1 Determinants of behavior.

7.4 Studies on determinants of dietary behavior

Research on determinants of dietary behavior is not as developed as research on other health behaviors, such as smoking and alcohol consumption. There is no clear conceptual framework. The few studies carried out give an ad hoc impression.

One of the possible explanations for this is the earlier-mentioned complexity of the concept of dietary behavior. In addition, until recently the knowledge acquired in studies of other health behaviors had not been applied to dietary behavior: many studies on dietary behavior focus on just one determinant, such as knowledge and attitude. Also, many studies have been carried out on special subjects, such as athletes. Finally, it seems that a practical application of the study results (e.g., the study results in points of impact for an intervention) was not the leading motive among the majority of the researchers. Usually, the relationship with the problem is not clear.

The results of several studies on the relationship between one or more of the above-mentioned determinants and specific dietary behaviors will be described in the following.

In one research project, the effects of attitude, social influence, and knowledge (of product composition) on the consumption of meat, meat products, butter, and milk, were

examined. The attitude towards these products was found to be a better predictor of actual consumption of the four products than social influence. The behaviors did not show a relationship with knowledge.

Studies on salt intake and consumption of skimmed, low-fat, and whole milk also showed attitude to be a stronger determinant than social influence. A positive attitude towards salt intake appeared to be primarily determined by the perceived advantage that food *tastes* better if it contains salt. In the case of milk, considerations of taste, *nutritional value* and suitability for a specific purpose, like making pudding, primarily determined the attitude. Financial considerations played no role at all. On the other hand, the opinions of family members strongly affected the choice of the milk type.

The frequency of consumption of ice cream, sweet yogurt and soda has been reported to depend more on taste considerations and opinions of others than on perceived health advantages or disadvantages of the behaviors.

The preferences for different kinds of meat were studied among elderly people (age 65 to 80). The respondents were asked to value 4 product characteristics of 11 kinds of meat. The characteristics were:

- sensoric quality (good taste, juicy, nice smell, nice appearance)
- amount of fat and unhealthiness (bad for health, bad for coronary heart diseases, overweight)
- exclusiveness (for special occasions, for the weekends, exclusive, expensive)
- convenience in preparing (short preparation time, unsuitable to prepare for more than one day).

The preference for the different kinds of meat could be explained for 16%, 14%, 13%, and 8% by the respective perceived product characteristics. There were, however, differences between preference and actual consumption.

In another study, mothers of pre-school children were interviewed. The responses of working-class mothers showed that *taste* was the most important determining factor for the choice of food in their families. In the case of middle-class mothers, however, health considerations were very important.

In a study on food choice in canteens, employees were asked prior to lunch which attitude and social considerations would play a role in their choice of lunch. The employees answered that prior to lunch they were guided by advantages such as taste, health and convenience. Behavior and opinion of the social environment were not very important. Afterwards, the first three considerations, and especially health considerations, appeared to be not so important in the actual choice of lunch. *Social influences* (friends chose the same lunch; friends said I should take this lunch) were relatively more important.

Further, the effects of experience with a food product, knowledge of nutrients, and several positive and negative aspects, such as taste, satiation, health and price on among other things, the consumption of milk, whole wheat bread, margarine and salads have been studied. *Taste* was found to be the most important determinant of all dietary behaviors. *Health* considerations were relatively more important for the elderly than for young people, as also shown in other studies. Finally, the results of a study on the determinants of dietary behavior in children showed that health considerations hardly influence children's dietary behavior at all. The same applied to financial considerations. However, *taste* considerations and the influence of the *social environment*, especially the behavior of the parents, were very strong determinants.

It has already been mentioned that, according to the theoretical model, *socio-demographic factors* have an (indirect) influence on behavior. This has been studied for some specific dietary behaviors.

Household income does not strongly affect the consumption of milk, bread, and eggs. The consumption of meat, fish, fresh vegetables, snacks, candies, whole wheat bread, and skimmed milk, however, was positively related to income. Larger families consume relatively less fresh vegetables and fresh fruit. Households with a highly educated mother consume more fruit, vegetables, milk products, meat, game, and fish than households with a less well-educated woman. Becoming older does not result in major changes in the choice of food products. However, the total energy intake decreases. No real differences between men and women in dietary behavior have been found. Women eat less, but not less varied food. In general, the interindividual differences in dietary behavior can only be partly explained by socio-demographic variables. Some studies have shown that, indeed, socio-demographic variables influence behavior indirectly through attitude or social influence, for example:

- health considerations have more influence on the dietary behavior of elderly people than on that of younger people;
- women, from higher socio-economic classes and ranging from 26 to 45 years of age have a more negative attitude towards the consumption of meat, meat products, butter, and milk than others.

7.5 Summary

A person's cultural environment is the central determinant of dietary behavior. The key question in this chapter is: what determines the differences in dietary behavior within a culture? In theory, three main groups of determinants can be distinguished at the microlevel: attitude, social influence, and possibilities. As far as the determinants of specific dietary behaviors are concerned, it can be concluded that the concept "attitude" can explain the interindividual differences in dietary behavior very well. Especially, taste considerations have quite a considerable effect on dietary behavior. For some people (mostly elderly), health implications are important; for others they are not important at all. With regard to the social aspects of dietary behavior, it is remarkable that behavior is not always related to this determinant. This might be due to the methods used to measure social influence: direct questions about the influence of the social environment are not effective, as people are not aware of the influence of the social environment or do not want to admit that they are influenced by their environment.

Information on the determinants of dietary behavior is incomplete. Research on the third main group of determinants, possibilities, is almost completely absent. Furthermore, many studies focus on just a small number of possible determinants, for example on attitudes or social influences on the behaviors only. Information on whether one determinant is more important than another cannot be acquired in this way.

More research into the determinants of specific dietary behaviors, based on a more complete theoretical framework, is necessary. The results of such studies should be aimed at points of impact for interventions.

Reference and reading list

- Ajzen, I., The theory of planned behavior, in: *Organizational Behavior and Human Decision Processes* 50, 1991.
- Axelson, M.L., The impact of culture on food-related behavior, in: *Ann. Rev. Nutr.* 6, 345–363, 1986.
- Bandura, A., *Social Foundations of thought and action*. Englewood Cliffs, N.J.: Prentice Hall, 1986.
- Contento, I., The effectiveness of nutrition education and implications for nutrition education policy, programs and research: A review of research, *J. Nutr. Educ.*, 27, 277–418, 1995.

- Dalton, S., Food choice: intention and practice, a study of intention and actual selections, in: *Hygie* 6, 9–11, 1987.
- Fishbein, M. and I. Ajzen, *Belief, attitude, intention and behavior*. Reading, Mass., Addison Wesley, 1975.
- Green, L.W., M.W. Kreuter, *Health promotion planning, an educational and environmental approach*. Mountain View, Mayfield, 1991.
- Hayes, D., C.E. Ross, Concern with appearance, health beliefs and eating habits, in: *Journal of Health and Social Behavior* 28, 120–130, 1987.
- Hochbaum, G.M., Strategies and their rationale for changing peoples eating habits. *Journal of Nutrition Education* 13 (suppl.), 59–65, 1981.
- Hollis, J.F. T.P. Carmody, S.L. Connor, S.G. Fey, J.D. Matarazzo, The nutrition attitude survey: associations with dietary habits, psychological and physical well-being, and coronary risk factors, in: *Health Psychology* 5, 359–374, 1986.
- Hulshof, K.F.A.M., *Assessment of Variety, clustering and adequacy of eating pattern, Dutch National food consumption survey*. Thesis. University of Limburg, Maastricht, The Netherlands.
- Kok, G., H. Schaalma, H. de Vries, G. Parcel, and Th. Paulussen, Social psychology and health education, in: W. Stroebe and M. Hewstone, Eds., *Eur. Rev. Soc. Psychol.* 7, Chichester, Wiley, 1996.
- Kok, G.J., H. de Vries, A.N. Mudde, V.J. Strecher, Planned health education and the role of self-efficacy: Dutch research. *Health Education Research* 6, 231–238. 225–233, 1991.
- Kronldle, M., M.S. Coleman, Social and biocultural determinants of food selection, in: *Progress in Food and Nutrition Science* 10, 179–203, 1986.
- Lau, S.D., *Nutrition behavior analysis: food perceptions as determinants of food use*. Dissertation University of Toronto, 1985.
- Michela, J.L., I.R. Contento, Cognitive, motivational, social and environmental influences on childrens food choices, in: *Health Psychology* 5, 209–230, 1986.
- Murphy, B.M., *Psycho-social factors that discriminate between people who report having made desirable changes in their diets from those who have not*. Dissertation Columbia University Teachers College, 1985.
- Prattala, R. and M. Keinonen, The use and the attributions of some sweet foods, in: *Appetite*, 5, 199–207, 1984.
- Shepherd, R., L. Stockley, Nutrition knowledge, attitudes, and fat consumption, in: *Journal of the American Dietetic Association* 87, 615–619, 1987.
- Shepherd, S., C.A. Farleigh, Preferences, attitudes and personality as determinants of salt intake, in: *Human Nutrition: Applied nutrition* 40, 195–208, 1986.
- Tuorila, H., Selection of milks with varying fat contents and related overall liking, in: attitudes, norms and intentions. *Appetite* 8, 1–14, 1987.
- Vries, H. de, M. Dijkstra, P. Kuhlman, Self-efficacy: the third factor besides attitude and subjective norm as a predictor of behavioral intentions, in: *Health Education Research* 3, 85–94, 1988.