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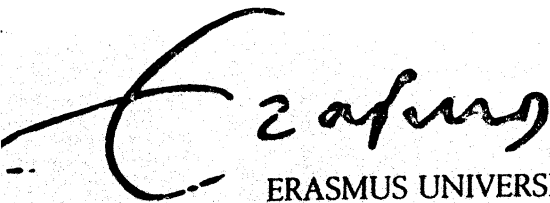
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A BEHAVIORAL COST-BENEFIT APPROACH TO THE
EXPLANATION AND PREDICTION OF BEHAVIOR

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Abstract

Psychological models of explaining and predicting behavior use the construct of attitude, whereas in economic models, assuming stable preferences, behavior is determined by budget constraints. In this article, a behavioral cost-benefit to the explanation and prediction of behavior is proposed. Behavioral costs include financial, temporal, physical, and social costs of initiating, maintaining and changing behavior. A behavioral model is proposed, in which cost-benefit tradeoffs of behaviors play a central role.

Introduction

Psychology, as the science of human behavior, is largely preoccupied with motivational constructs to describe, to explain, and to predict the behavior of individuals and small groups. These are two main aspects of motivated behavior: First the energizing or activating aspect, and second the directional aspect. Motivational activation produces a state of readiness for behavior (arousal). In addition to producing a state of readiness for behavior, an activated motive also tends to set off behavior in a particular direction.

Simple reflex behavior is not usually thought of as motivated behavior, although even such reflex behavior such as the heartbeat and digestion serve purposes in the life of the organism, and are responsive to various kinds of motivational activation.

In several psychological models motivation is treated as an unrestricted behavioral tendency towards goals. In the Fishbein-Ajzen (1975) attitude model only unfavorably evaluated beliefs may serve as restrictions to behavior. For instance, predicting purchasing behavior, an unfavorably evaluated price may be a restriction to buy a product with favorably evaluated characteristics. However, as a consequence of the linear-compensatory combination rule of the Fishbein-Ajzen model, an unfavorably evaluated price may be compensated by the favorably evaluated beliefs/attributes of the product, or the beliefs about the consequences of buying/possessing the product.

Economics, as the science of the allocation and usage of scarce resources, is largely preoccupied with restrictions due to limited resources. Preferences are considered to be stable, and behavior is explained by utility maximization within budget constraints. In most economic models, only financial budgets are considered, although time budgets (Becker, 1976) and physical (health) budgets (Lesourne, 1979) appear in some economic models. In economic models the financial and other constraints determine behavior, only within a budget some freedom of choice may exist.

Meyer (1982), an economist addressing the attitude-behavior relationship, observes that attitude measurement does not include the relevant opportunity costs of an act, consequently, cannot be used as a reliable predictor of behavior.

In this article, a theoretical model of behavior will be presented, extending the Fishbein-Ajzen model of reasoned action. Special attention will be given to the "two-valued logic" of micro-economics, comprising the (positive) outcomes or consequences of behavior, as well as the (negative) behavioral costs that have to be incurred by the individual in order to behave.

Toward a behavioral model

Both in psychology and in economics, models have been developed to describe, to explain and to predict behavior or specific forms of behavior, e.g. consumer behavior. The behavioral model we want to introduce, is a combination of the extended attitude-behavior model and a utility model. We depart from the Fishbein-Ajzen (1975) model of reasoned action. This model will be critically evaluated and some extensions will be introduced. Then, departing from the micro-economic approach, utility models and a behavioral extension of the economic cost concept will be discussed. Finally, we hope to integrate both approaches.

Fishbein and Ajzen's model has the purpose of contributing to the understanding and prediction of behavior. It can be represented in the form of three formulas (Fishbein and Ajzen, 1975):

$$(1) B \sim BI = w_1 (Aact) + w_2 (SN)$$

$$(2) Aact = \sum_{i=1}^m (b_i * e_i)$$

$$(3) SN = \sum_{j=1}^m (nb_j * mc_j)$$

In the model it is supposed that the intention (BI) to perform a certain behavior (B) is a function of the weighted (w_1) attitude (Fishbein and Ajzen define attitude as affect) toward performing a behavior (Aact) and the weighted (w_2) Subjective Norm (SN) (Formula 1). A behavioral intention is seen as consisting of a personal and a social component.

The attitude toward a behavior is a function of the expected consequences or outcomes of behavior (beliefs $* b_i$) and the evaluations of these expected consequence or outcomes (e_i) (Formula 2).

The Subjective Norm in the model is a function of social norms to perform a behavior (nb_j) and the motivation to comply with these norms (mc_j) (Formula 3). If no unanticipated circumstances occur, a behavioral intention will be converted into the corresponding behavior.

In the manifold applications of the model convincing evidence is provided of the predictive and explanatory power of the model (See for a review Ajzen and Fishbein, 1980). Several issues with regard to the application of the model have been raised: problems with regard to theoretical assumptions underlying the model, operationalization problems with concepts in the model and a number of analytical problems.

Extensions of the Fishbein-Ajzen model

In the Fishbein-Ajzen (1975) attitude model it is assumed that the attitude toward the act precedes the performance of the act. However, Bem (1967, 1972), in his self-perception theory, proposed the reversed order: attitudes following behavior. Fishbein and Ajzen (1975) state that past behavior can only influence future behavior through the beliefs or the motivation to comply. Bentler and Speckart (1979) and Bagozzi (1981a, 1981b, 1982) demonstrate that this assumption is incorrect. Van Raaij and Verhallen (1983a) argue that behavior may be induced by attitudes and that through feedback attitudes may change as a consequence of behavior (See Figure 1).

Figure 1 about here

Three types of feedback effects are distinguished (Van Raaij and Verhallen, 1983a):

- (1) Internalization. According to Bem's (1967) self-perception theory, persons adapt their attitudes in such a way that these become consonant with their behavior. The formation and change may occur through a process of internalization or self-perception.
- (2) Learning. From their behavior persons may learn the consequences, and change their evaluative beliefs accordingly. They may also learn to relate certain consequences of behavior to general attitudes. Changes in relational beliefs (Fishbein, 1967) may occur.
- (3) Habit formation. By performing behavior people may establish new pattern of behavior that, once they are formed, are repeated over time, and remain to be performed as such, without cognitive or evaluative content.

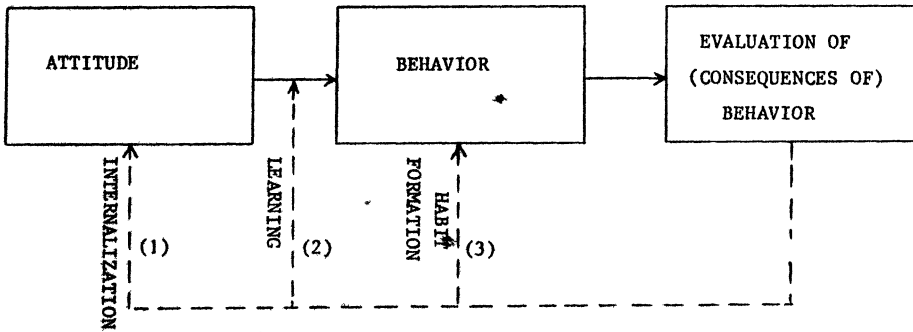


Figure 1. Three feedback mechanisms.

In the behavioral model of Van Raaij and Verhallen (1983a) the attitude-behavior or behavior-attitude discussion is "solved" by allowing both orders to exist. In an longitudinal study on the separation of household waste, Pieters and Verhallen (1985) find that separate beliefs are better predictors of behavior than a joint attitude measure, if behavior is just learned. Later in the process, an overall attitude measure was shown to be a better predictor of behavior. An explanation is that attitudes are being formed over time based on behavioral experiences. The order relationship is in fact a circular, reciprocal one.

Non-intentional behavior

The Fishbein-Ajzen (1975) attitude model only attempts to predict and to explain intentional behavior under volitional control. They refer to their model as to a theory of reasoned action (Ajzen and Fishbein, 1980). However, not all behavior is intentional. Some authors include "other variables" in their attitude-behavior model. Sheth (1974) adds a separate habit-controlled mechanism. Van Raaij and Verhallen (1983a) distinguish situational and behavioral contingencies to explain energy conservation behavior (Figure 2).

Figure 2 about here

In Figure 2, it is shown that behavior, as reasoned action, can be determined by attitudes, influenced by life-style (values and established behavioral patterns); and by the social and physical situation. Verhallen and De Nooij (1982) show that specific store choices for daily shopping can be understood from the perspective of store patronage, as part of a shopping pattern. Oppedijk van Veen and Verhallen (1984) demonstrate that specific vacation activities can be part of different vacation styles or patterns. Specific acts can be understood and predicted from the behavioral context, they are part of (Van Raaij and Verhallen, 1983b). The situation has also a direct effect on behavior, in the sense that people are constrained by physical, temporal, institutional, spatial, social and financial factors. Anticipated situations are another determinant. For instance, people may anticipate the formality of a situation and dress accordingly. Sarver (1983) argues that a "context of opportunity" is a necessary requirement for an attitude and its corresponding behavioral intention to be expressed in overt behavior. We may also argue that a given situation may facilitate or even trigger a certain behavioral response. Some authors (e.g., Dawes, 1975, and Foxall, 1984) even argue that most behavior is adapted to or contingent on situational or task factors.

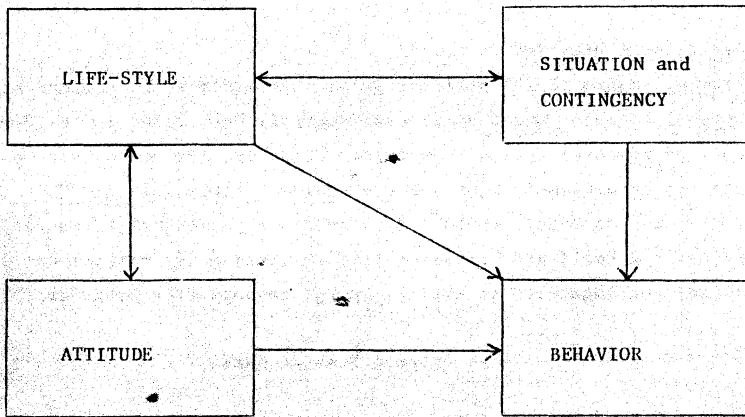


Figure 2. Determinants of behavior.

Factors moderating the attitude-behavior relationship.

Ajzen and Fishbein (1977) describe the conditions for the observation of a significant relationship of attitudes and behavior. Attitudes and behavioral entities consist of four elements: (1) the action, (2) the target at which the action is directed, (3) the context in which the action is to be performed and (4) the point in time when the action is performed. The content of these elements might be either general or specific. A significant relationship between attitude and behavior cannot be observed, unless both the attitude and the behavioral entity correspond with regard to those four elements.

By specifying the four behavioral elements (action, target, context and time) a maximum correspondence is achieved between attitudes and actions. Disturbing factors in the attitude-behavior relationship are defined in such a specific way that the amount of overlap between the mental and the corresponding behavioral level is minimized. In this way, as soon as an aspect of the context changes, the attitude may not be relevant anymore. The generality, stability and the enduring character of the attitude concept is sacrificed in order to gain predictive power.

Another aspect of the attitude-act specification requirements should be mentioned. If we have to measure an attitude for each of the thousands of acts (see Barker, 1980) an individual performs each day, we should be endlessly repeating attitude-act studies, every time with a somewhat different act. Olshavsky (1982) criticizes such an approach of Warshaw (1980). Further, it is questionable whether such a specific act is still an object of human reasoning. For example Ehrenberg (1974) and Lastovicka and Bonfield (1982) assert the non-existence of brand attitudes in many instances.

Rather than making attitudes more and more specific, we look for more enduring and lasting relationships. This means that we should define larger behavioral entities, broadening the scope of the behavioral measure (Weigel and Newman, 1976) or broadening the attitude measure (Heberlein and Black, 1976).

It has also been argued that the study of attitudes should encompass both specific as well as general measures. "Both specific and general attitudes ought to be included in a study to predict behavior, and the entire causal model from general attitudes to specific attitudes to behavior ought to be charted" (Heberlein and Black, 1976, p.479; Triandis, 1980).

In the behavioral model of Van Raaij and Verhallen both specific and general attitudes are represented. Justifying this inclusion they mention (Van Raaij and Verhallen, 1983a, p. 52): "general attitudes may provide a general context shaping more specific and critical factors".

Relating general attitudes to specific behavior leads to the inclusion of intervening factors that specify the attitude-behavior relationship (Verhallen and Pieters, 1984). In Van Raaij and Verhallen (1983a) four intervening factors between attitude and behavior are postulated (Figure 3). Modifying Schwartz's (1970, 1975) theory of the activation of moral norms, the factors "acceptance of responsibility" and "perceived effectiveness" are included, in order to relate general attitudes to specific behavior. Van Raaij and Verhallen (1983a) add the factors "relational knowledge" and "cost-benefit tradeoff".

Figure 3 about here

Acceptance of responsibility is the attribution of responsibility for the behavior to oneself. Consumers may have a negative attitude towards environmental pollution, but may blame others (industry, government, agriculture) for polluting the environment. Denying one's responsibility means that there is no need to change one's behavior.

Perceived effectiveness of one's behavior refers to the personal efficacy one perceives. The effects of behaviors should exceed a threshold of effectiveness to be performed. This may point to a conjunctive decision rule: Acceptable behaviors are behaviors with a minimal level of perceived effectiveness.

Relational knowledge is the knowledge of the costs and benefits of the behavioral alternatives. Knowledge is needed to accept responsibility, to judge the perceived effectiveness, and to make cost-benefit tradeoffs. Knowledge is defined as the sum of relational descriptive beliefs (Fishbein, 1967). This means that an individual knows that the act belongs to a behavioral category, i.e. the set of acts that have a common goal or valued end state (Ajzen and Fishbein, 1980). Verhallen and Pieters (1984) define a behavioral field as the set of instrumental acts that lead to the same goal. These acts are more or less substitutable.

In the cost-benefit tradeoff, the costs and benefits of the instrumental acts are compared. This is the main theme of this article, to be treated extensively in later sections.

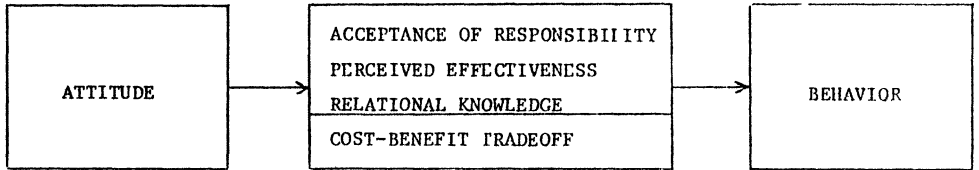


Figure 3. Intervening factors in the attitude-behavior relationship.

The micro-economic approach.

The micro-economic approach to consumer choice starts from the "two-valued logic" of the preferences and (financial) means of the consumer. Preferences are generally considered to be stable, while the means, available to the consumer, determine the range of alternatives that may be purchased. In the indifference curve approach, the utility of combinations of goods x and y is compared. The indifference curves I, II and III (Figure 4) are the sets of combinations that provide an equal utility to the consumer. The (financial) means of the consumer are given in the budget restriction B_1B_2 , the set of combinations of x and y that can maximally be bought by the consumer. Due to the budget restriction the maximally attainable indifference curve is II. Indifference curve III is not attainable with the budget B_1B_2 , whereas indifference curve I is sub-optimal to the budget line B_1B_2 .

Figure 4 about here

An increase in the consumer budget results in a budget line C_1C_2 parallel to B_1B_2 . If the price of good x decreases, the budget line will change accordingly.

Figure 5 about here

The new budget line B_1B_4 (Figure 5) is the result of a price decrease of good x . As a consequence of the price decrease of good x , two separate effects may be distinguished. The first effect (substitution) is that the price ratio of goods x and y changes. The consumer will buy more of x and less of y (point B_3 on the budget line B_2B_6). The substitution effect is positive for x , that became cheaper, and negative for y , that became more expensive.

The second effect (income effect) is that the consumer moves to a higher-level indifference curve, from B_3 to B_7 . The consequence of the price change of x is both a substitution and/or an income effect.

The psychological and economic approaches.

The psychological approach to explaining and predicting behavior is largely motivational. Attitudes and lifestyle are frequently used constructs as determinants of behavior. General attitudes are poor predictors of specific behaviors, unless a number of intervening variables have been included. In economics, preferences are taken for granted; budget restrictions determine choice behavior.

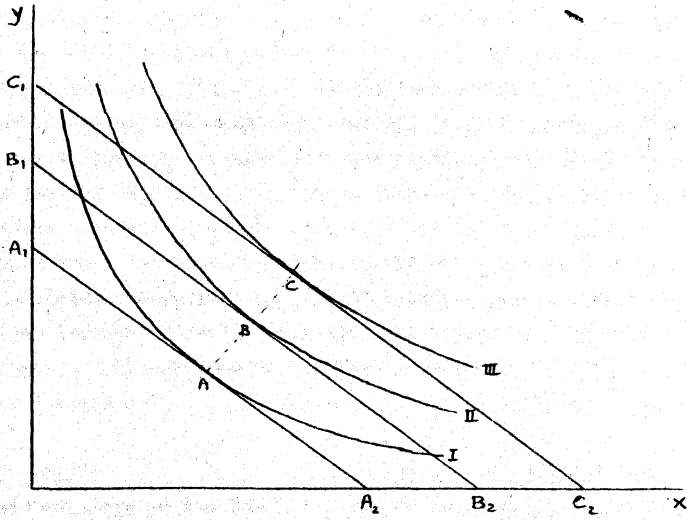


Figure 4. Indifference curves and budget lines.

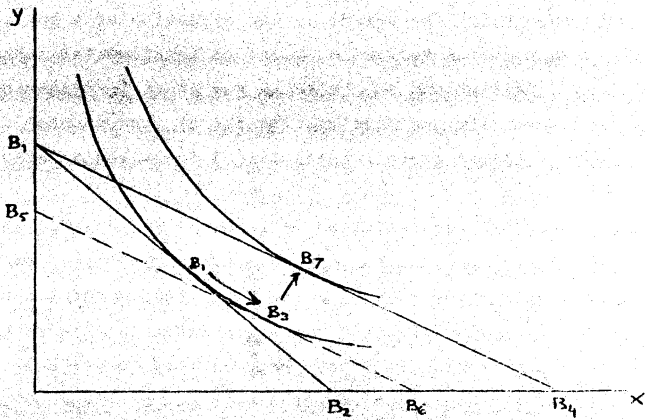


Figure 5. Substitution and income effects.

In economic models, price is not simply a product attribute, but price is traded off against other product attributes, such as quality. However, one should distinguish price and cost; cost being the ratio of price and budget: $\text{cost} = \text{price}/\text{budget}$. This means that the price of a product or service will be traded off against the product attributes (quality). The costs, however, take away part of one's budget. It is likely that the costs of expenditures will be compared on a generic level, i.e. the costs of a vacation versus the costs of a new washing machine. Individuals differ with regard to their budgets, based on income differences and on product involvement. For someone, a vacation is very important and, consequently, a relatively large budget will be seen as a generic choice between product/service categories or between behavioral fields, whereas specific choice is the choice between alternatives or instrumental acts with a category or behavioral field.

Behavioral benefits and goals.

The definition of behavior in psychological and economic models has received less attention than the definition of the constructs determining behavior.

Verhallen and Pieters (1984) distinguish goal acts and instrumental acts. Goal acts or consummatory responses are defined as acts, which by performing lead to a state of the organism which is desirable for the actor and which makes that the goal ceases to exist. Pure consumption is such a goal act. Instrumental acts are acts that bring the person in the direction of a goal. In many instances, people have a choice between a number of instrumental acts. For instance, to get a healthy condition one may select a number of instrumental acts, such as jogging, exercising, and dieting. The set of instrumental acts leading to the same goal or valued state (equifinality) is called a behavioral field.

Acts or behaviors are evaluated in terms of the degree, in which they lead to the goal. Instrumental acts that will bring you closer to the goal, will be preferred, unless the costs are too high. Instrumental acts are substitute ways of reaching a goal. Selecting one instrumental act reduces the necessity to select another instrumental act, because they constitute independent ways in the direction of the goal. Instrumental acts may be complementary as well; one instrumental act may support another instrumental act to reach a goal (interaction effect). In a sequential manner, one instrumental act may be followed by another instrumental act to reach a goal.

Acts will be thus chosen based on their instrumentality of reaching the goal. Goals may be stated in terms of a desired financial, social, physical status, self-realization, or in terms of possessions. Terminal goals may be too far away to reach; thus realistic subgoals might be stated. Atkinson (1957) argue that "achievers" set a realistic goal to reach and select instrumental acts to attain the goal. The attainment of goals that are too easy or too difficult, do not lead to an internal but to an external attribution. Everyone resp. no one could reach that goal. Attaining goals of an intermediate level of difficulty leads to an internal attribution: Through one's capability and effort, the goal has been attained. A stable internal attribution (capability) is predictive to future successes. An unstable internal attribution (effort) is less predictive, only if enough effort will be spent one may be successful. Most achievement behavior, however, is a combination of capability and effort (Van Raaij, 1985).

Behavioral costs.

Instrumental acts are characterized by benefits and costs. The costs are financial, social, physical, psychic, and time costs involved in pursuing the instrumental act. Social costs comprise compliance, instrumental services and acceptance (Blau, 1964). Individuals have money and time budgets and limited physical resources to pursue an instrumental act. The behavioral costs of an instrumental act are the money, time and physical energy spent on the act. For instance, a shopping trip takes time, effort, and money to be successful.

Substitutions are many. One may save money by spending time and effort (do-it-yourself products), one may save time by spending money (frozen dinners), or one may save effort by spending money (delivery service). It depends on one's budgets, how much money, time, and effort one could spend on an instrumental act.

The behavioral costs (BC) are the summation of the ratio's of the prices and the budgets:

$$BC = \frac{FP}{FB} + \frac{TP}{TB} + \frac{PP}{PB} + \frac{SP}{SB} = \frac{BP}{BB}$$

In which: FP = financial price
TP = time price
PP = physical price
SP = social price
FB = financial budget
TB = time budget
PB = physical budget
SB = social budget
BP = behavioral price
BB = behavioral budget.

The price consists of task or behavior characteristics, i.e. the sacrifice the task/behavior requires of the person, in terms of the money to be paid, the time to be spent and the effort to be expended to perform the task or to complete the behavior.

The budget provides the means to expend on a task or behavior. Persons possess financial, time and physical budgets to allocate to a number of instrumental behavior (or tasks). The budget is a constraint, although highly involved persons may allocate larger budgets to goals they consider to be important. The physical budget depends on physical capacities of the person (endurance). Staveck and Crano (1982) use the word "vested interest" as a proxy for the behavioral budget allocated to a behavioral field.

In economics, several types of costs are distinguished: fixed vs. variable costs, investment vs. operating costs, and sunk costs. Fixed costs are preparatory investments in order to perform a number of instrumental behaviors, e.g. learning BASIC in order to use the personal computer. Variable costs are the costs of using BASIC at a number of occasions of PC use. However, mastering BASIC might also be seen as investment costs, in order to make future (programming) behavior less costly. Operating costs are the costs of using BASIC at later occasions. Higher investment costs may reduce later operating costs. Opportunity costs are the costs of forgone gains, missed income or missed opportunities. Forging more hours has the opportunity costs of forgone leisure. Attending school has the opportunity costs of forgone income. Thaler (1980) sentences out-of-pocket costs or direct expenses as "losses". Out-of-pocket cost of a loss is more negatively valued than forgone gains (opportunity costs) (Van Driel, 1985). A surcharge for not paying in time is perceived as a more severe penalty than forgoing a discount for paying in time. Although opportunity costs

are often overlooked, they should be added to the behavioral costs of an instrumental act (Meyer, 1982).

Sunk costs (Thaler, 1980) imply that paying for the right to use a good or service will increase the rate at which the good will be utilized. Historical costs matter and not only incremental costs and benefits affect decisions. Dramatic examples are the constructions of the Oosterschelde-dam and the nuclear reactor of Kalkar; their immense sunk costs are a major incentive to complete these constructions. Aronson and Mills (1959) studied the effect of the degree of effort (behavioral cost) on the evaluation of group membership. The severe initiation group enjoyed group membership better than a control group. Money, time and effort spent in the past are a major determinant to continue and to enjoy the consequent behavior. Sivacek and Crano's (1982) concept of "vested interest" is a social analogon of sunk costs.

Cost-benefit tradeoffs.

Stating a goal and trying to attain this goal through instrumental acts requires a tradeoff between the benefits and the costs of alternative instrumental acts. This is certainly not new. Clawson (1950) already applied Lewin's field or topological theory to consumer behavior. The basic concept in Clawson's model is that consumer behavior is governed by the outcome of an internal psychological conflict. Each decision has a number of positive and negative aspects, called "valences". A purchase will result, if the sum of all positive valences is greater than the sum of all negative valences. Hence, in Lewin's field theory, positive and negative valences are balanced in a summation rule.

General intentions, such as energy conservation, have to be implemented in instrumental acts to attain the goal of a lower energy consumption level. Examples of these instrumental behaviors are: turning down the thermostat, closing curtains, insulating the home, installing a more efficient heating system, wearing a jersey or a sweater, etc. Each of these instrumental behaviors has its own costs and benefits. Home insulation is effective, but at high investment costs. Wearing a sweater is less effective, but at low costs. Persons will select that instrumental behavior that has the most favorable cost-benefit ratio, provided that the costs can be paid from the available budget.

Social exchange theory (Homans, 1961) states that social prices, such as compliance, have to be paid (Blau, 1964) in order to receive an intrinsic or unilateral social reward. Individuals trade off social costs and social benefits or rewards. Again, social cost is the ratio of social price and social budget.

Many behaviors are at once desirable (benefits) and undesirable (costs). You like candy, but you do not want to get fat. The costs and benefits may be about equal and create an "approach-avoidance conflict". A child enjoys school, but looks forward to vacation; his or her attitude towards school is ambivalent. A goal that is at once attractive and dangerous results in vacillation. The dangers (costs) seems less real when the goal is at a distance, so that the inviting character (benefits) leads to approach behavior. But the sense of danger increases as the goal is approached, so that nearer to the goal one has a tendency to withdraw. Both opposing tendencies lead to a point near enough to the goal for one to be aware of the dangers, but distant enough to be safe from them (Brown, 1948 and Miller, 1959). Both tendencies can be depicted as approach and avoidance gradients; benefits and costs, respectively.

Positive investment behavior occurs, when the behavioral costs are "paid" at time t_1 , whereas the benefits come at a later point in time t_2 , e.g. preventive health care. Negative investment behavior occurs, when the benefits come at time t_1 , and the costs at a later time t_2 , e.g. drinking and smoking. It depends on one's time perspective, whether one engages in negative or positive investment behavior. Future costs and benefits may be discounted and have to be higher than present-time costs and benefits (cf. interest rate).

Behaviors may bring benefits for oneself, but costs ("external costs") for others, e.g. a noisy party. Altruistic behavior brings costs to oneself, but benefits to others, although it may be argued that altruistic behavior, e.g. gift giving, brings social benefits to a person to offset the financial costs. Behaviors that result in short-term personal benefits, but long-term societal costs (external effects) constitute a "social trap" (Platt, 1973). People tend to engage in these behaviors, e.g. behaviors with negative environmental consequences such as car driving, without being aware of the long-term societal costs, e.g. acid rain.

Another distinction that should be made, is the distinction between engaging a behavior (initiation) versus maintaining a behavior. Different costs and benefits may be involved in a behavioral change and in maintaining a behavior. Behavioral change involves opportunity costs of forgoing the alternative, costs of learning the new behavior includes habit information, forgetting about alternatives and positive feedback information about the behavior. Sunk costs may be a major reason why people continue their behavior, as well as the high costs of changing one's behavior.

Pieters, Verhallen and De Jong (1985), in a longitudinal design study household participation in waste separation. Behavioral costs and benefits are the major determinants of the intention to participate at the start of the program (behavioral initiation). Maintaining the behavior is mainly determined by an attitude measure that integrates the behavioral costs and benefits (Figure 6).

Figure 6 about here

A model of behavior.

Van Raaij and Verhallen (1983a) developed a model of energy behavior, which can easily be generalized to a general model of behavior (Figure 7). Behavioral initiation, maintenance and change, are types of instrumental behaviors toward a particular goal. The evaluation of behavior is the degree to which the behavior brings one closer to the goal. Factors intervening between general intentions and specific intentions are acceptance of responsibility, perceived effectiveness, relational knowledge, and, most importantly, cost-benefit tradeoffs. Knowledge about the costs and benefits of instrumental behaviors is influenced by specific information and by learning through feedback.

Figure 7 about here

The behavioral model contains five ways to affect the behavior for public policy (circles in the model): (1) general information, (2) specific information, (3) subsidies and prices (4) three types of feedback, and (5) requirements and regulation approaches. It is predicted that specific information is more effective in influencing behavior than general information, because of the fact that specific information may directly influence the cost-benefit tradeoffs of the instrumental costs. General information may, however, be needed to justify public policy measures. Prices and subsidies change the costs of instrumental acts and, thus, make these more or less attractive (e.g. merit goods). The fifth public policy approach is to restrict the contingencies, so that undesirable behaviors cannot be pursued or are made more difficult to pursue, e.g. restrictions on the sale of alcohol and tobacco.

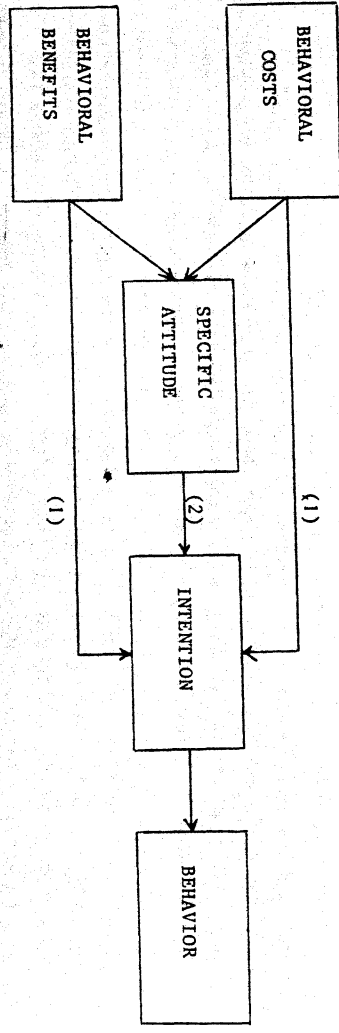


Figure 6. Behavioral costs and benefits, and specific attitude determining behavioral intention.

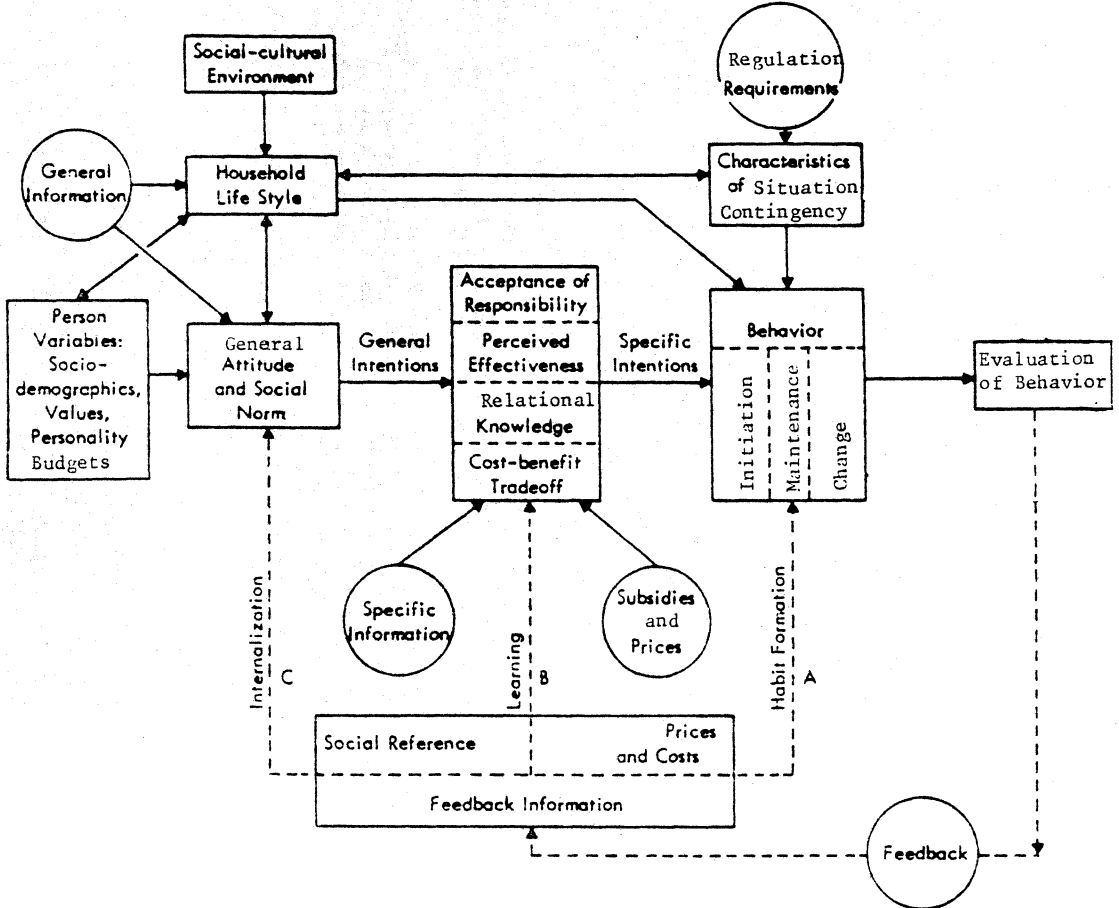


Figure 7. A general model of the determinants of behavior.

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