# Self-Efficacy: The Third Factor Besides Attitude and Subjective Norm as a Predictor of Behavioural Intentions

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# Self-efficacy: the third factor besides attitude and subjective norm as a predictor of behavioural intentions

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## Abstract

**When explaining (health) behaviour much attention is paid to attitudes and subjective norms. It is assumed that self-efficacy expectations will significantly increase the prediction of behavioural intentions. Therefore, the self-efficacy concept from Bandura's social learning theory has been integrated together with the two factors of the Fishbein–Ajzen model within one model to explain behavioural intentions. Results of a hierarchical regression analysis support the above-mentioned hypothesis: attitudes and subjective norms are significant predictors of the intention (not) to smoke, but self-efficacy expectations add significantly to the prediction of the intention. Self-efficacy has also a direct effect on behaviour, after controlling for intention. Our interpretation is that in this study self-efficacy probably highly reflects the actual control or the skills of the adolescents. This study also supports the results of Ajzen and Madden (1986) who indicated that perceived behavioural control expectations increased the predictions of behavioural intentions. Furthermore, it appears that non-smoking adolescents have higher self-efficacy expectations towards non-smoking than smokers.**

## Introduction

When explaining (health) behaviour much attention is paid to attitudes and social influences regarding an individual's behaviour. This study shows that a third cognitive factor, personal efficacy expectations or self-efficacy, is also a relevant variable in explaining behaviour. Firstly, for the explanation of attitudes and social influences the Fishbein–Ajzen model (1975) will be used. Secondly, self-efficacy, a concept from the social learning theory (Bandura, 1977, 1986) is described. Finally, a model about behaviour is explained, based on the hypothesis that behavioural intentions can best be predicted by the individual's attitude, subjective norms and self-efficacy expectations. This study thus integrates elements of the social learning theory with the Fishbein–Ajzen model.

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### Attitudes and subjective norms

Attitudes and social influences are two factors which have been extensively used to explain (health) behaviour. The theory of Fishbein and Ajzen (1975) constitutes an example by assuming that behaviour can best be predicted by the behavioural intention, which is determined by the individual's attitude and the perceived subjective norms from other people. Attitude is determined by: (i) the expectation of various consequences, beliefs ($b$) about the behaviour, and (ii) the corresponding evaluations ($e$) of these consequences. It is measured as follows: attitude $= \Sigma\, b \times e$. Subjective norms consist of: (i) the expectation of other important persons' opinions, normative beliefs ($nb$), and (ii) the degree to which an individual is inclined to agree with these opinions, the motivations to comply ($mc$). The subjective norm can be determined as follows: subjective norm $= \Sigma\, nb \times mc$. The Fishbein–Ajzen model (1975) has been successfully applied for the explanation of several behaviours (see, for example, Ajzen and Fishbein, 1980), such as alcohol (London, 1982; McCarty *et al.*, 1983), drugs (Lacy, 1981),

marijuana (Budd *et al.*, 1983), seat-belt use (Budd *et al.*, 1984), tin-recycling (Kok and Siero, 1985) and smoking (Bauman and Chenoweth, 1984; Chassin *et al.*, 1984; De Vries and Kok, 1986; Newman and Martin, 1982; Page and Gold, 1983).

## Self-efficacy

An important question, however, is whether attitudes and subjective norms are indeed the only significant factors that play a role when explaining behaviour. Bandura (1977, 1986) indicates the importance of personal mastery expectations of an individual regarding a desired behaviour. According to Bandura, behaviour and behavioural change depend on both outcome expectations and personal efficacy expectations. Outcome expectations consist of beliefs about whether a particular behaviour will lead to particular consequences. They are beliefs about consequences of an act and correspond highly with Fishbein's and Ajzen's conception of beliefs. Self-efficacy refers to a person's expectation regarding his capability to realize a (desired) behaviour. It does not reflect a person's skills but rather one's judgements of what one can do with whatever skills one possesses. Therefore, self-efficacy relates to beliefs about capabilities of performing specific behaviours in specific situations.

Bandura indicates that self-efficacy expectations can vary along three dimensions: magnitude, generality and strength. Magnitude refers to level of task difficulty. Self-efficacy expectations may be limited to simple tasks (low magnitude), or can include difficult tasks as well (high magnitude). Generality refers to the generalization of efficacy expectations to other behaviours. Efficacy expectations may be limited to one particular domain of behaviours (low generality) or can be extended to other and different behaviours (high generality). Strength refers to the judgement of how certain a person is about the ability to perform a behaviour. Weak expectations will be changed more easily by disconfirming experiences than strong expectations. In the latter case, a person will persevere more strongly in his coping efforts to master a particular behaviour.

How do self-efficacy expectations develop? Bandura describes that efficacy expectations are based upon four principal sources.

(i) People learn through experience. Performance accomplishments or enactive attainments constitute the most influential source of efficacy information. Self-efficacy expectations increase through successive mastery of behaviour while repeated failures lower them.

(ii) Vicarious learning can also contribute to the development of efficacy expectations. Other people serve as a frame of reference. Self-efficacy appraisals are especially sensitive to vicarious information if people have little prior experience with certain behaviours and if the criteria for evaluating performances are diverse or vague. Vicarious experiences are generally weaker than direct ones but can produce persisting changes as well.

(iii) Verbal persuasion is another means to insert or to increase efficacy expectations in individuals. People who are persuaded verbally are more likely to mobilize more effort than if they remain convinced of their incapabilities. Persuasion has the greatest impact on efficacy expectations of people who have some reason to believe that they can perform the desired behaviour effectively.

(iv) Physiological information can influence self-efficacy as well. If people have too much arousal, they are less inclined to expect success than if they have moderate levels of arousal. For example, having trembling hands during a driving test might cause a person to think that they are very nervous and unable to drive well.

Although these sources can provide efficacy information, more important is how this information will be appraised cognitively by the individual. Appraisal is an inferential process. Therefore, self-efficacy expectations are not only dependent on information by the above-mentioned sources, but also and perhaps mostly on how a person integrates this information in his cognitive system. For example, people infer high self-efficacy from success achieved through minimal effort on difficult tasks, but they infer low self-efficacy if they had to work hard to master easy tasks.

Self-efficacy seems related to other concepts regarding self-appraisal and coping behaviour (see also Strecher *et al.*, 1986). As Bandura (1986) indicates, self-efficacy differs from self-concept theories. Self-concept theories are more involved with global self-images, whereas self-efficacy is more concerned with judgements of personal abilities. Self-efficacy differs also from locus of control. A person's belief that behaviour is internally controlled does not imply that one is able to carry out the desired behaviour. Anxiety is also a different concept. Self-efficacy scales measure whether a person can perform a specific behaviour, independent of the fact whether the behaviour will be performed with or without anxiety. In the description of coping Seligman (1975) makes a distinction between personal and universal helplessness. Personal helplessness refers to an individual's loss of control of a particular situation and is comparable to low efficacy. Universal helplessness arises when certain consequences take place, independent of an individual's behaviour. Self-efficacy is related to the coping process described by Lazarus and Folkman (1984). Their definition of secondary appraisal concerns the evaluation of how a person can cope with a threat. During this coping process, a person considers (i) which coping strategies are available, (ii) the likelihood that some strategy will result in the expected outcome and (iii) whether he can use the coping strategy effectively. It is evident that the second part of the process refers to outcome expectancies while the third part describes self-efficacy. Rogers (1983) subdivides the concept of efficacy into self-efficacy and response-efficacy. While the former is similar to Bandura's definition, the latter refers to an individual's adequate behavioural response to an undesired behaviour. For example, an effective behavioural response in preventing lung cancer is to stop smoking. Response-efficacy can also be defined in terms of the Fishbein–Ajzen model as beliefs towards an attitude object.

The Fishbein–Ajzen model has often been the subject of further exploration (see, for instance, Miniard and Cohen, 1981; Budd *et al.*, 1983; Fredericks and Dosset, 1983; Wittenbraker *et al.*, 1983; Liska, 1984; Schifter and Ajzen, 1985; Bagozzi *et al.*, 1986; Budd and Spencer, 1986; Grube *et al.*, 1986; Sutton, 1987). Recently, Ajzen and Madden (1986) have added perceived behavioural control as a third factor. This factor contributed significantly to the prediction of the intention besides attitude and subjective norm. Although the description and operationalization resemble self-efficacy (they also refer to Bandura's concept of self-efficacy), their notion covers both perceived and actual control of behaviour. However, Bandura (1986) indicates that self-efficacy and actual control are different concepts. Although self-efficacy will be influenced by actual control, the surplus value of self-efficacy expectations concerns the cognitive appraisal of actual control. Bandura cites a study of Collins (Bandura, 1986, p. 424) which demonstrates that subjects with an equal ability to solve mathematical problems, differed in solving a mathematical task because of (manipulated) differences in their self-efficacy.

Therefore, a clear conceptual distinction has to be made between self-efficacy expectations (or perceived behavioural control) and the abilities or skills (or actual control) of a person. When one assesses skills just before the assessment of behaviour, there will probably be a close correspondence between self-efficacy and actual control in a relatively simple task. This may be the case in the Ajzen and Madden experiment. Students had to estimate their chances of getting an 'A' just before their final exams. Their success will mostly be dependent on the acquired knowledge of the past weeks. Consequently self-efficacy expectations will correspond closely with actual control. However, this correspondence may be less clear as estimates about simple tasks will be difficult (e.g. because one is not familiar with the requirements of the task) or when behaviour is complex and dependent on several variables. Thus, self-efficacy and actual control are related, but are different concepts.

## Model for behavioural change

From the foregoing, the following model to explain behavioural intentions and behaviour can be deduc-

ed. Whether someone intends to perform a particular behaviour is determined by personal conceptions concerning this behaviour (the attitude), the social pressures experienced from other important persons (the subjective norms) and personal expectations about the skills needed to realize the behaviour (self-efficacy). It is possible that a positive attitude towards, for example, living on a diet, and positive influences from the social environment go together with negative expectations concerning the skills needed to live on a diet (e.g. my cooking does not suffice to prepare complicated dishes). On the other hand, a person having positive expectations about the necessary skills may have a negative attitude towards dieting behaviour. Hence, models for change of behaviour and health education programmes have to pay attention to increasing personal efficacy expectations as well. According to our conception attitudes, subjective norms and self-efficacy are cognitive factors. Together they result in the intention to perform the behaviour. A further elaboration of this model suggests that the relation between the three factors could be interactive instead of linear. In this case intentions will be positive if self-efficacy is high and either or both attitude and social norms are positive as well. However, Ajzen and Madden (1986) found no evidence for significant interactions between perceived behavioural control and attitude or subjective norms. The realization of the behaviour is not only dependent on a positive intention, but also on the skills or actual control a person has to realize the behaviour. The above-mentioned is summarized in the following model to explain behavioural intentions and behaviour (see Figure 1) in which elements of Bandura's social learning theory and the Fishbein–Ajzen model are integrated.

This study aims at proving the predictive value of self-efficacy when explaining (health) behaviour and is based on the assumption that, besides the attitude and the subjective norm, personal efficacy expectations may have an unique contribution in predicting behavioural intentions. Ajzen and Madden (1986) also found a direct relationship between self-efficacy and behaviour, which can be expected: (i) if the behaviour is not under complete volitional control, and (ii) if self-efficacy reflects actual control in a situation with some accuracy. As smoking is a behaviour which satisfies these conditions, we could expect a direct effect of self-efficacy on behaviour. Furthermore, the possibility for interactions between attitude, subjective norms and efficacy will be analysed. A second objective is to examine the possible differences between smokers and non-smokers with regard to their personal efficacy expectations. The assumption is that non-smokers will have higher self-efficacy about non-smoking than smokers.

## Method

### Sample

In this study, carried out in 1986, 85 third-grade Dutch pupils of various secondary schools participated. Forty percent of them were male ($n = 34$) and 60% of them female ($n = 51$). Although an attempt was made to involve a secondary technical school this did not succeed; therefore females are slightly over-represented in the sample. Age of the adolescents varied between 14 and 17 years (16, 59, 21 and 4% respectively).

### Questionnaire

Questions to assess attitudes, subjective norms and intentions were based on the questionnaire used by De Vries and Kok (1986). With the aid of, among others, a factor analysis with respect to attitude and subjective norms, those questions were selected which were thought to be the most relevant. This

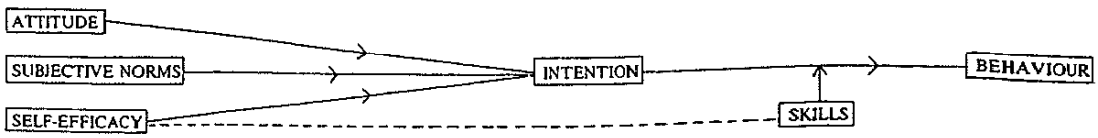


Fig. 1. Model to explain behavioural intention and behaviour.

resulted in 16 questions on the evaluations and the beliefs of the following consequences of smoking: a bad physical condition, expense, coughing, cancer, damaged lungs, showing off, it causes passive smoking for others, nausea, irritated eyes, combating boredom, bad health, a nice taste, smelling badly, sociability, irritating other people, getting wrinkles. Evaluations and beliefs were measured on a seven-point scale.

Eight questions on the normative beliefs and the motivations to comply also used seven-point scales, and assessed the subjective norms of: mother, father, brother, sister, friends, classmates, teachers and the physician.

Although the questionnaire also used direct measures of attitudes and subjective norms, these are not used in this study because of lower predictive value for the intention than the indirect measures of attitudes and subjective norms. The nine questions on self-efficacy had never been used before. They comprised: finding it difficult/easy when friends smoke; being able to stop smoking when wanting to; knowing a reason to refuse a cigarette offered; being able to refuse a cigarette offered by parents; being able to refuse an offer; succeeding in staying/becoming a non-smoker; being able to refuse a cigarette offered by friends; being able to maintain to refuse smoking in spite of being called a coward. These questions were measured on a seven-point scale where +3 means high efficacy and −3 means low efficacy. One item measured the intention to smoke: 'I intend to smoke (+3), not to smoke (−3)'. Behaviour was assessed by one question. Pupils were asked to indicate whether they: (i) had never smoked, not even one cigarette, (ii) had experimented with smoking (having smoked up to five cigarettes) but were not regular or occasional smokers, (iii) were ex-smokers, (iv) smoked occasionally, (v) smoked at least once a week or (vi) smoked every day. To check their statements the number of cigarettes smoked per week and per month were asked as well.

### Procedure

The pupils were requested to complete the questionnaire. A brief explanatory introduction provided them with information on how to answer the questions. This explanation was repeated regularly. The complete study further included the film 'The Feminine Mistake'and a final assessment to determine the effects of the film. This study only describes the results of the pretest.

## Results

### Correlations between attitude, subjective norm and self-efficacy

A factor analysis on the self-efficacy items resulted in one factor. The nine questions regarding self-efficacy formed a reliable scale ($\alpha$ = 0.80). For the analysis these questions have been summed to form one self-efficacy scale. Figure 2 shows that the correlations of the attitude and the subjective norm with the intention were respectively 0.66 and 0.47. These correlations are comparable to the correlations found by De Vries and Kok (1986) in a similar study: these were respectively 0.61 and 0.50. Self-efficacy had the same predictive value as the attitude: the correlation with intention was also 0.66. The correlations of attitude and subjective norms with behaviour were respectively 0.55 and 0.48. The correlation between self-efficacy and behaviour was 0.71 which is higher than the correlation between self-efficacy and intention, and only slightly lower than between intention and behaviour ($r$ = 0.74). One explanation of this high correlation is that self-efficacy reflects actual control (or skills) to a high degree and thus has a high direct effect on behaviour.

The multiple correlation ($R$) of the attitude, the subjective norm and self-efficacy with the intention was 0.79. This means that the three variables together explained 63% of the variance for the behavioural intention. Figure 2 also shows the intercorrelations between the three variables. It appears that all three factors correlated moderately. Self-efficacy correlated 0.47 with the attitude and 0.34 with the subjective norm. The attitude correlated 0.43 with the subjective norm.

It is possible that self-efficacy is not a different factor but merely a result of attitude and subjective norm. To determine whether self-efficacy had a unique contribution to the prediction of the behavioural intention apart from the contribution of

attitude and subjective norm, a hierarchical regression analysis was conducted. For the prediction of the intention, attitude and subjective norm were entered first, and self-efficacy second.

Table I shows the results of the hierarchical regression analysis. It appears that the attitude explained 44% of the variance in behavioural intention ($P < 0.001$), and that the subjective norm added 4% ($P < 0.05$). The personal efficacy expectations, however, added afterwards 15% ($P < 0.001$). It is evident that, besides attitude and subjective norm, self-efficacy had a significant and unique contribution to the prediction of the behavioural intention. Table I furthermore shows the results of the hierarchical regression analysis for the prediction of behaviour. In this analysis, the intention was entered on the first step while attitude, subjective norms and self-efficacy were entered stepwise on the second step. The results of the analysis show that self-efficacy had a significant unique contribution of 9% ($P < 0.001$) in the prediction of behaviour. The intention and self-efficacy explained 63% of the variance of behaviour. Our interpretation is that the self-efficacy scale corresponded highly with the actual control or the skills of the adolescents, and therefore could have a direct effect on behaviour apart from intention.

To test the assumption whether the relationship between attitude, subjective norms and efficacy was interactive, self-efficacy was multiplied with attitude and with subjective norms. (Note: as the attitude and subjective norm scores initially varied from −3 to +3, the scores were transformed to positive scores to avoid artificial effects for the multiplicative variables.) The resulting product scores were entered into the hierarchical regression analysis after the basic variables (see also Cohen, 1978). The interactions did not show a significant effect on the predictions of intention, nor on behaviour. Therefore we did not find any support for an interactive nature of the model.

## Smokers and non-smokers: attitude and subjective norm

The differences between smokers and non-smokers were mostly similar to those found by De Vries and Kok (1986). The present study also revealed that non-smokers more than smokers ($P < 0.05$) believed

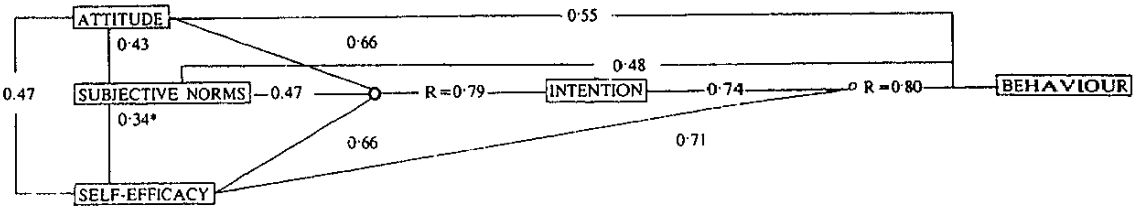


Fig. 2. Correlation of attitude, subjective norms and self-efficacy with the behavioural intention ($n = 68$; $P < 0.001$; *$P < 0.005$).

Table I. *Hierarchical multiple regression analysis ($n = 68$)*[a]

| Step | Variable | $R$ | $R^2$ | change in $R^2$ | $F$ | $\beta$ | $P<$ | $r$ |
|---|---|---|---|---|---|---|---|---|
| Prediction of intention | | | | | | | | |
| 1 | Attitude | 0.66 | 0.44 | 0.44 | 51.00 | 0.66 | 0.001 | 0.66 |
| 2 | Subjective norm | 0.69 | 0.48 | 0.04 | 5.09 | 0.22 | 0.027 | 0.47 |
| 3 | Self-efficacy | 0.79 | 0.63 | 0.15 | 25.44 | 0.43 | 0.001 | 0.66 |
| Prediction of behaviour | | | | | | | | |
| 1 | Intention | 0.74 | 0.55 | 0.55 | 79.20 | 0.74 | 0.001 | 0.74 |
| 2 | Self-efficacy | 0.80 | 0.63 | 0.09 | 15.86 | 0.40 | 0.001 | 0.71 |

[a]Due to missing values on the five factors, the population was reduced to 68

that smoking causes bad health, a bad physical condition, damages the lungs, forces others into passive smoking, and causes a bad smell and irritated eyes. Smokers did recognize these negative consequences, but minimized their importance. Smokers more strongly believed ($P < 0.05$) than non-smokers that smoking has several advantages, like sociability, good taste and relief of boredom. Both groups did not differ significantly about opinions on smoking being expensive and offensive to others, causing coughing, nausea, wrinkles and increasing the chances of cancer and the incidence of showing off.

Non-smokers experienced a stronger social pressure against smoking from their parents, brothers and sisters, friends, classmates and the physician ($P < 0.05$). They did not differ on the slight negative social influence about smoking coming from the teachers.

### Differences in self-efficacy

Multivariate analysis showed that smokers and non-smokers had different opinions about their personal efficacy expectations ($F = 71,15$; $df = 1,83$; $P < 0.001$). The results of the univariate analysis are depicted in Table II.

Table II shows that smokers perceived greater difficulties than non-smokers: not to smoke when friends are smoking, in thinking of a reason to refuse a cigarette, to refuse an offer of a cigarette, to refuse cigarettes offered by parents and to explain to other people that they do not want to smoke. Smokers also perceived greater difficulties in being able to stop smoking, and to become a non-smoker. The latter is of course quite understandable.

Although non-smokers had higher self-efficacy expectations about non-smoking in several situations, they did not differ from smokers on all situations. Smokers as well as non-smokers perceived themselves as being capable of refusing a cigarette offered by friends, and of knowing how to respond when called a coward because of not wanting to smoke.

## Summary and conclusions

The most important goal of this study was to support the assumption that self-efficacy, apart from attitude and subjective norms, has a significant unique contribution to the prediction of the behavioural intention. It appeared that attitude and self-efficacy each explained 44% of the variance of intention with regard to smoking. The subjective norm explained 22%. Together, after correction for overlap, the three variables explained 63% of the variance of the behavioural intention.

Theoretically it is possible that personal efficacy expectations can be derived from, or are based upon attitude and subjective norm. In that case, self-efficacy cannot be considered as a separate factor or concept. However, the results of a hierarchical regression analysis indicated that personal efficacy expectations, besides the attitude and the subjective

**Table II.** *Reported mean scores of self-efficacy; comparison of smokers (S) with non-smokers (NS)*

| Item | S ($n = 21$) | NS ($n = 63$) |
|---|---|---|
| When my friends smoke I find it very hard/easy not to smoke | −0.76 | 2.21[a] |
| When I should wish to stop smoking, I shall certainly/certainly not be able to do so | 0.30 | 1.31[a] |
| When someone offers me a cigarette, I certainly do/certainly do not know a reason to refuse that cigarette | −1.23 | 2.19[a] |
| When my parents offer me a cigarette, I certainly do/do not dare say no | 2.00 | 2.55[a] |
| When I am offered a cigarette, I find it very difficult/easy to refuse | 0.23 | 2.57[a] |
| For me it is very difficult/easy to stay (become) a non-smoker | −0.77 | 1.41[a] |
| When my friends offer me a cigarette, I certainly do/do not dare say no | 2.15 | 2.75 |
| When people call me a coward because I do not want to smoke, I certainly do/do not know what to say | 2.18 | 2.08 |
| I find it very difficult/easy to explain to other people that I do not want to smoke | 0.68 | 1.86[a] |

+3 = high self-efficacy towards non-smoking; −3 = low self-efficacy.
$\alpha = 0.80$; [a] $P < 0.05$.

norms, had a unique contribution. After attitude and subjective norms, together explaining 48% of the variance, self-efficacy added an additional 15%. Together with attitude and subjective norm, self-efficacy thus appeared to be a significant factor when predicting the behavioural intention. This study also supports the results of a study by Ajzen and Madden (1986) which indicated that perceived behavioural control expectations increase significantly the predictions of behavioural intentions.

After controlling for the intention, which explained 55% of the variance, self-efficacy also had a direct effect on behaviour and added 9%. Our interpretation is that this direct effect of self-efficacy on behaviour reflects the impact of skills or actual control. Ajzen and Madden (1986) reported a similar result and stated that this effect is likely to be the case under two conditions. First, the behaviour must at least be determined by factors beyond a person's control. If the behaviour was under the complete control of an individual, self-efficacy expectations would not be relevant. Second, self-efficacy expectations should reflect actual control with some degree of accuracy. It appeared that the correspondence between self-efficacy and actual control can also be high for more complex behaviours which require, for example, refusal skills, such as smoking. However, one might expect the direct effect of self-efficacy to disappear in future studies, if actual control could be assessed as well. In such a case we assume that it would be highly unlikely that self-efficacy would still have a direct effect on behaviour if it is controlled for intentions and actual control. On the other hand, if future research does indicate that there is often a high correspondence between self-efficacy and actual control, there may be less need to include the difficult assessments of skills.

Non-smokers appeared to have higher self-efficacy than smokers. This might possibly be explained by the fact that in a number of situations smokers are likely to be less motivated to refuse a cigarette because they (want to) smoke. However, smokers and non-smokers did not differ from each other on all items. Therefore, the difference between smokers and non-smokers cannot be completely ascribed to differences of motivation. Moreover, in order to support this assumption, differences within non-smokers (intenders versus non-intenders) have been analysed as well. A similar pattern for self-efficacy was found as the one characteristic for smokers and non-smokers.

At present, it is not yet clear for which behaviour self-efficacy or attitude or subjective norms will be the most important predictor. From a health educational point of view it might be interesting to know which factor has the greatest impact on an individual's behaviour. If a decision for a behaviour is mostly dependent on, for example, self-efficacy expectations, health educational activities might focus only or mostly on influencing this factor. Personal efficacy expectations of skills may play a significant role when an individual needs to have specific skills in order to perform a particular behaviour (e.g. refusing to smoke cigarettes, to drink alcohol at a party, proposing to use condoms). Attitude may play an important role when realization of behaviour is

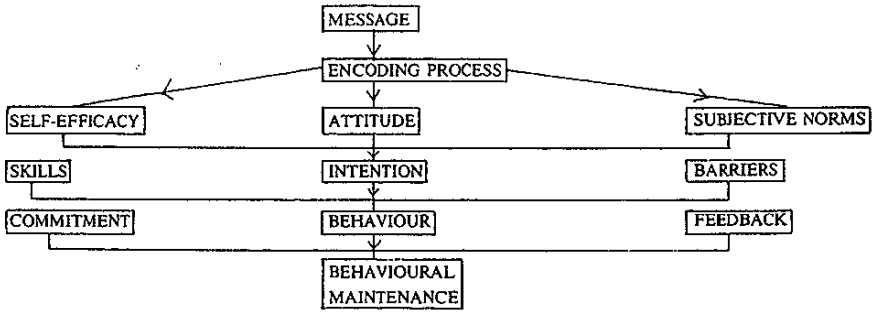


Fig. 3. Model of information processing and behavioural change and behavioural maintenance.

relatively easy (e.g. giving up excessive sunbathing), but when expectation of advantages and disadvantages is more decisive. Subjective norm is expected to be an important predictor in case of behaviour that is closely related to other people (e.g. in the decision to become a vegetarian). Den Bandt (1982) supports this assumption. In her study on voluntary childlessness the subjective norm was as important a predictor as the attitude ($r = 0.62$). However, more research is needed in order to obtain insight into the relative importance of these three factors for various behaviours. From the longitundinal point of view it would also be interesting to determine which of the three factors will be the best predictor of future behaviour.

One of the implications of the above findings is that smoking prevention programmes should increase perceptions of self-efficacy in non-smokers in order to enhance their chances of behaviour maintenance. However, behaviour change and behaviour maintenance are not only dependent upon attitude, subjective norms and efficacy expectations (see Figure 3). Prevention research indicates that several factors are relevant (see, for example, Flay *et al.*, 1983), and which will have to be taken into consideration if we want to influence health behaviours. Skills are needed for the realization of the desired behaviour. For instance, if someone wants to live on a diet he or she has to know how to prepare low-calory dishes. Barriers, such as the unavailability of certain ingredients and the inability to buy them, may hamper realization of behaviour. Outcome expectations should correspond with a person's expectations about the behaviour. Thus feedback of the new behaviour should correspond with expected effects. The likelihood of maintenance of behaviour will increase when a person shows commitment. When publicly shown, this commitment will be stronger than when expressed anonymously (Kiesler, 1971; Janis and Mann, 1977).

Furthermore, Petty and Cacioppo (1986) indicate that attitude and behaviour change do not always occur by extensive cognitive processing of information by the individual, but may be caused by simple affective mechanisms as well. After having received a message, the individual can encode it in two different ways. On the one hand, a person may start extensive cognitive processing by paying much attention to the attitude, the subjective norms and self-efficacy expectations. On the other hand, a person may process the message using more simple decision rules and will focus, for example, on only some consequences. The impact of self-efficacy expectations are thus also dependent on the way an individual processes information. Chances for using the cognitive route increase if, for example, the individual is involved in the subject. Therefore, health education should take into account the characteristics of the target group. If the target group is not really motivated, the chances of extensive cognitive processing of information by this group will be rather low. In such a case campaigns utilizing a more affective approach may be more successful. However, Petty and Caccioppo (1986) also state that the chances of long-term behavioural change will be higher if it is induced by the cognitive route.

In conclusion, there is evidence that supports the assumption that self-efficacy is an important factor besides attitudes and subjective norms in determining the intention. However, behavioural change and its maintenance is also dependent on other factors, and on the way an individual processes information regarding these factors. Further research is needed to enhance insights into processes which are relevant for information processing, health education and prevention of unhealthy behaviours.

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