# Technology Adds New Principles to Persuasive Psychology: Evidence from Health Education

Arie Dijkstra

University of Groningen, Social and Organizational Psychology,
Grote Kruisstraat 2/1, 9712 TS, Groningen, The Netherlands
a.dijkstra@ppsw.rug.nl

**Abstract.** Computer-technology has led to the use of new principles of persuasion. These new principles constitute the unique working mechanisms of persuasion by means of computer. In the present study, three tailored messages that each contained one potential working mechanism - personalization, adaptation or feedback - were compared with a standard information condition. Two hundred and two students who smoked tobacco daily were randomly divided over four conditions. After the computer pre-test questionnaire, they read the information in their condition and filled in the immediate post-test. After 4 months, they were sent a follow-up questionnaire assessing their quitting activity. The data show that personalization (44.5%) and feedback (48.7%) but not adaptation (28.6%) led to significantly more quitting activity after 4 months than did the standard information (22.9%). Moreover, the effect of condition on quitting activity was mediated by individuals' evaluations of the extent to which the information took into account personal characteristics.

## 1 Introduction

Advances in computer-technology have expanded the possibilities to persuade people using text. Of all the possibilities that computers offer, increasing the personal relevance of a text by directly or indirectly incorporating information that was provided by the individual into the text, opens new perspectives in persuasion. Although all the possibilities of increasing the personal relevance of a text were available since humans write texts and letters, computers have opened the possibility to apply the possibilities on a large scale. In addition, because computers are now used widely, this "tailoring of information" is used more and more in society, for example in the domain of health.

The tailoring of information to individual characteristics to enhance effectiveness may be a large step forward in the field of health education [1,2,3,4]. During the last ten years, many studies have been conducted to show the superiority of tailored materials over standard materials. Several studies show that tailored information is more effective than existing standard materials. However, in most of these studies, tailored and non-tailored materials were used that not only differed in the extent to which they took individual characteristics into account, but also differed in the type of information given, the amount of information, and the lay-out [5]. Few studies have

W. IJsselsteijn et al. (Eds.): PERSUASIVE 2006, LNCS 3962, pp. 16 – 26, 2006.

been undertaken in which tailored materials were compared with similar but non-tailored materials. Only such studies can show whether the tailoring of information is a fundamental step forward in persuasion. The results of these well-controlled studies are mixed. Some found that tailoring was more effective [6,7]; others found no difference [8, 9]; while other researchers found interaction effects [10, 11], meaning that tailored information was effective only in subgroups of the examined samples. Therefore, the state of the art is that tailored information *can* be more effective than non-tailored information.

To further develop tailored materials, their working mechanisms must be identified. That is, the working mechanisms are responsible for the sometimes superior efficacy of tailored materials, and further shaping and testing of the working mechanisms may lead to more effective tailored materials. Although several researchers of tailored health information have hypothesized on the working mechanisms and the psychological mechanisms involved, to the best of our knowledge, no studies have been designed and published in which working mechanisms were explicitly theorized on.

The present study was designed to enhance our understanding of the sometimes superior effects of tailored communications from two perspectives: the characteristics of the tailored information and the psychological processes involved. Different working mechanisms and psychological processes have been proposed in the literature [7; 3; 8]. In the present study, the structure of characteristics of tailored communications as proposed by [8] was refined. In tailored communications, three potential working mechanisms are distinguished: personalization, adaptation and feedback. Personalization refers to incorporating recognizable aspects of a person in a general text. The recognizable feature or set of features refers undeniably to the person: for example, the person's first name or the combination of objective behavioral features such as the number of cigarettes smoked, the number of years the person smoked and the brand smoked. While, in personalization, specific features are mentioned in a text with general content, adaptation of information refers to adaptation of the content of the text itself. By adapting a text to a person's relevant characteristics, such as socio-demographic characteristics or the person's intention to change, the content information may become more relevant and less redundant. For example, a persuasive text for a smoker with small children may differ from that for a smoker without children. Similarly, the information offered to a smoker with low motivation to quit may differ from the information offered to a smoker with high intention to quit. The remaining working mechanism, feedback, refers to the provision of information about a person's state of which the person him- or herself may not have been (fully) aware [12]. For example, people may not be aware of the psychological denial they use to lower their anxiety for physical consequences. If the denial can be assessed, this information may be provided as feedback. In attempts to lower fat consumption, feedback on actual fat consumption has been proven to be of major importance [13].

In the present study, the "self-referent encoding" of information is used as the primary explanation. That is, the working mechanisms are thought to induce a process of "self-referent encoding". We assume that a latent scan of all environmental stimuli - including offered information – operates, which is focused on identifying self-relevant stimuli. If a stimulus is identified as being relevant for or referring to the self, the process of self-referent encoding of the information is started. Self-referent encoding refers to the interpretation and coding of external information against the background of

the self. Self-referent encoding comprises a deeper and richer processing of information in which the information is more actively compared with the person's own previous experiences, which comprise the self [14]. Self-referent encoding has been shown to enhance recall of offered information in several studies [15]. Personalization and feedback are thought to contain cues that trigger a process of self-relevant encoding. The extent to which adapted information is interpreted as being relevant for the self is thought to depend on the person's involvement in the issue. That is, in the case of low involvement with the topic of the tailored information, the adapted information can be discarded because it does not explicitly or undeniably refer to the self.

In the present study, we used a self-report measure of self-referent encoding. We argue that, during the reading of a tailored message, the extent of the self-referent encoding is experienced as the extent to which the information matches or takes into account the self. In several studies, tailored communications were rated as significantly more personal or as better taking into account the individual's situation [6,7,8,13]. Moreover, [8] showed that the extent to which the information was experienced as personal was significantly related to behavioral change. In the present study, we expected that the extent of self-referent encoding would mediate the effects of the working mechanisms on cognitive and behavioral changes.

## 2 Method

### 2.1 Participant Recruitment and Characteristics

Students who were daily smokers were recruited in the Faculty of Social Sciences by two means. Firstly, students could register their phone numbers on forms distributed in the lounge of the faculty. They later were phoned to make an appointment to come to the lab. About half of the participants in this study were recruited using this procedure. Secondly, students in the faculty lounge were asked to participate in the study immediately; no students refused to join the study.

Students were told that the study concerned the evaluation of a text that was to be used in a new brochure on smoking and smoking cessation. Participants would earn €5 and when they completed the four months follow-up assessment they had the chance of winning one of 4 bonus prizes amounting to €25.

Two hundred and two students participated in the study of whom 59% was female and the mean age was 22.2 years (SD=6.5). On average, the students had smoked for 5.8 years (SD=6) and they smoked 13 cigarettes a day (SD=7.4). The mean score on a measure of intention to quit smoking in the following six months with a 7-point scale was 3.2 (SD=1.92).

### 2.2 Procedure

On arrival in the lab, participants were registered, and they were asked to take a place in a cubical room and to follow the instructions on the personal computer. The pre- and posttests and the (tailored) texts were programmed in Authorware 4 (MacroMedia). After three screens of short instructions, the pretest assessment was conducted. Following this, the participants were exposed to the information in the condition they were randomly assigned to. After reading the text, the participants

were directed to the posttest assessment. After the posttest, the program indicated that the study was over. The participants filled in a form to receive their financial compensation and they were asked whether they agreed to receive a follow-up questionnaire after four months. They were informed that completion of the follow-up assessment would earn them a chance to win one of 4 bonus prizes of 25 euro. All participants agreed to this and registered their names and addresses. Of the 202 lab participants, 141 (70%) returned the follow-up questionnaire four months later.

### 2.3 Experimental Conditions

Participants were randomly assigned to one of four conditions (Table 1). In all conditions the information that was offered comprised four screens of information of about 200 words each.

**STAN condition.** The STAN condition (n=51) offered the standard non-tailored information. In the three tailored conditions, this information was tailored in three different ways. The information in the STAN condition consisted of four texts. The first text was about the long-term serious negative health consequences of smoking, the second text offered information on the short-term negative physical consequences of smoking, the third text was on the negative social consequences of smoking, while the fourth text dealt with the negative self-evaluative consequences of smoking.

**PERS condition.** The PERS condition (n=50) offered the same text as did the STAN condition, but it incorporated four recognizable personal features in the text. In the text on the first screen, the individual number of cigarettes and the type of cigarettes a participant smoked (cigarettes with or without filter or hand-rolled cigarettes) were mentioned. In the second text, a person's first name and the number of years he or she had smoked were mentioned once. In the third text, only a person's first name was mentioned once, while, in the fourth text, a person's first name was mentioned twice.

**ADAP condition.** In the ADAP condition (n=51), the information was adapted to certain individual features but the texts were written as if they were meant for a general audience. For females, the text on the first screen offered information on the long-term consequences of smoking specifically in women (n=32). Males were offered information specifically about the consequences in men (n=19). If the participant indicated at the pretest that he or she took part in sport weekly, the second text dealt with the short-term negative consequences of smoking in general for sports accomplishments (n=19). Otherwise, the text was not about physical activity but tried to focus the attention on bodily symptoms of smoking such as cough and dizziness (n=32). If the participant indicated at the pretest that non-smokers "regularly" or "often" inhaled their secondary smoke, the third text offered general information on the effects of passive smoking and the inconvenience to non-smokers (n=29). Otherwise, the text did go into passive smoking but argued that the perception of smoking was changing in society (n=22). If the participant indicated at the pretest that he or she would not evaluate him- or herself more positively if he or she stopped smoking, the fourth text argued that smokers are often defensive when persuasive attempts are made to encourage them to stop smoking and that they therefore often use excuses to smoke (n=38). If the participant indicated that he or she would evaluate him- or herself more positively if he or she stopped smoking, the text was about how

painful feelings of shame and dissatisfaction with oneself can be, and how strong the relief is in the case of quitting (n=13).

**FEED condition.** The FEED condition (n=50) added one or two sentences of personal feedback on the basis of pretest scores before the non-tailored information was provided (while removing the first one or two introductory non-tailored sentences). In the text on the first screen, individual feedback (two possible feedback messages) was added on the participants' awareness of the serious dangers of smoking on the basis of a pretest item that assessed the expected long-term consequences (e.g. "It appears from your responses to the questionnaire that you underestimate the dangers of smoking"). In the second text, individual feedback (three possible feedback messages) was added on experienced symptoms attributed to smoking on the basis of 1) a pretest item that assessed the frequency with which participants experienced smoking-related symptoms; 2) the number of cigarettes smoked a day (e.g., "You hardly notice from the reactions of your body that you are smoking. This might be because you are not a heavy smoker. However,…."). In the third text, individual feedback (two possible feedback messages) was added on the participants' high or low awareness of the increasingly negative views of smoking on the basis of shame for smoking assessed at the pretest (frequent shame indicated high awareness; e.g., "From your answers, it seems that you barely perceive that smoking is viewed increasingly negatively"). In the fourth text, individual feedback (four possible feedback messages) was added on having or not having a biased view of the consequences of smoking in order to regulate negative emotions. This was done on the basis of an excuses score and the reported positive self-evaluation in the case of quitting (e.g., "From the questionnaire, it seems that you are so dissatisfied with yourself because you smoke that you try not to think about it").

### 2.4 Measures

In the pretest, the following variables were assessed for psychometric use. Smoking behaviour was assessed in terms of the number of years smoked and the number of cigarettes smoked per day. The demographic information assessed concerned gender and age. Intention to quit was assessed in the following way. Smokers were asked to indicate the plan that best described their own plans with regard to their smoking behaviour. The categories were "I am planning to quit within 30 days" (1); "I am planning to quit within 6 months" (2); "I am planning to quit within 12 months" (3); "I am planning to quit within 5 years" (4); "I am planning to quit within 10 years" (5); "I am planning to quit sometime in the future but not within 10 years (6); "I am planning to keep on smoking but to cut down" (7); "I am planning to keep on smoking and not to cut down" (8). Self-efficacy was assessed using three items on 7-point scales on the difficulty of quitting smoking, on being able to quit smoking, and on the perception that a person can quit smoking ($\alpha$=.76). Because the participant's state of arousal could affect the reactions towards the information offered in the conditions, the present state of arousal was assessed using four items on 7-point scales: "How nervous do you feel at this moment?"; "How relaxed do you feel at this moment?"; "How unsure do you feel at this moment?"; and "How calm do you feel at this moment?". The mean item score was used as the scale score ($\alpha$=.81). The following post-test variables were assessed immediately after the participants had read the information. The main outcome measure was the attitude towards smoking. Attitude was assessed using eight items on 7-point

scales. Principal component analyses showed two clearly separate factors which we called affective attitude towards smoking ($\alpha$=.78) and cognitive attitude towards smoking ($\alpha$=.80). The affective attitude scale was composed of two items: "I find smoking": very unpleasurable (1)/very pleasurable (7); very untasteful (1)/very tasteful (7)". The cognitive attitude scale was composed of four items: "I find smoking": bad (1)/good (7); stupid (1)/smart(7); very unwise (1)/very wise (7); totally safe (1)/ very dangerous (7). Two sets of information-evaluation measures were used. The first set concerned four items on the general message evaluation on 7-point scales: "Did you find the information reliable?"; "Did you find the information difficult to understand?"; "Did you find the information interesting?"; and "Did you find that the information was honest?". The second set of evaluation items concerned the tailoring-evaluation items. These items were expected to be related to the extent of the self-referent encoding of the information: "Was the information directed to you personally?"; "Did the information take into account your personal situation as a smoker?"; "Did you recognize your own opinion in the information?"; and "Did the information take into account who you are?".

To assess quitting activity at the four-month follow-up, a single measure of quitting activity was composed indicating "any quitting activity" (1) or "no quitting activity at all" (0). Four items were used to assess quitting activity: A "no" in response to the questions 1) "Did you smoke at all since you were in the lab?"; 2) "Did you smoke during the last seven days?" or; 3) "Did you smoke during the last thirty days?" was coded as quitting activity. Furthermore, a "yes" in response to the question: 4) "Did you make an attempt to quit since you were in the lab?", was coded as quitting activity. No biochemical verification of the self-reported quitting behavior was conducted, for three reasons. Firstly, the announcement of biochemical verification could be expected to increase non-response and dropout. Secondly, with regard to the questions 1) and 4), no biochemical validation is possible. Thirdly, the present study can be classified as placing "low demands" on the participants; hence, their self-reported smoking behavior was considered to be sufficiently valid (see Velicer, Prochaska, Rossi, & Snow, 1992).

### 2.5 Randomization and Attrition

A randomization check was conducted by comparing individuals in each condition in respect of gender, age, number of cigarettes smoked a day, number of years the individuals smoked, intention to quit, self-efficacy, and arousal assessed at the pretest. The results showed that the conditions differed significantly in respect of the number of years the individuals smoked and age. However, neither variable had significant relations with any of the outcome measures ($p>.25$). The characteristics of the participants who did not return the four-month follow-up questionnaire were compared with those of the participants who did in respect of the pretest variables. The results showed that the group that failed to return the follow-up questionnaire comprised a significantly larger number of males, and that members of this group had smoked for significantly fewer years. Again, neither variable was related to the follow-up outcome measure, quitting activity.

### 2.6 Statistical Analyses

To tests the effects of Condition on quantitative outcome measures, analyses of variance were used. To test the effects of Condition on the dichotomous outcome measure

"Quitting activity", logistic regression analysis was used. Pretest variables were included as covariates when the p-value of the relation with the dependent variable was smaller than .20. All tests were two-sided and the significance level used was p<.05.

# 3 Results

## 3.1 Tailoring Evaluation

To test whether the manipulations had differentially influenced the participants' perceptions of the extent to which the information was tailored, ANCOVAs were computed using each of the four process evaluation measures as dependent variables, condition as factor, and age, the number of cigarettes smoked a day, and self-reported arousal at the pretest as covariates. Firstly, it was tested whether the effects of condition on tailoring evaluation depended on pretest intention to quit. For none of the four measures this was the case. Secondly, the main effects of condition were tested. As shown in Table 1, the extent to which participants perceived the information as being directed to them personally approached significance, F(3,194)=2.16, p=.094.

Contrast analyses showed that participants in the FEED condition scored significantly higher (p<.05) than those in the STAN and ADAP conditions. The PERS condition did not differ significantly from any of the other conditions. The extent to which participants perceived the information as having taken into account their situation as smokers differed significantly, F(3,194)=11.42, p<.001. Contrast analyses showed that participants in the PERS condition and in the FEED condition scored significantly higher (p<.05) than those in the STAN condition. In addition, scores in the ADAP condition were significantly lower (p<.05) than the scores in the FEED condition.

**Table 1**

*Means of tailoring-evaluation items in each condition*

| | Condition | | | | Sign. |
|---|---|---|---|---|---|
| | Standard n=51 | Personalized n=50 | Adapted n=51 | Feedback n=50 | |
| Directed at you personally | 4.10[a] | 4.59 | 4.14[b] | 4.82[ab] | .094 |
| Takes into account your personal situation as a smoker | 3.38[ac] | 4.42[a] | 3.44[d] | 4.74[cd] | .000 |
| Recognizes your own opinion in the information | 3.60 | 4.13 | 3.95 | 4.12 | .28 |
| Takes into account who you are | 3.13[ac] | 3.80[c] | 3.16[b] | 3.80[ab] | .017 |

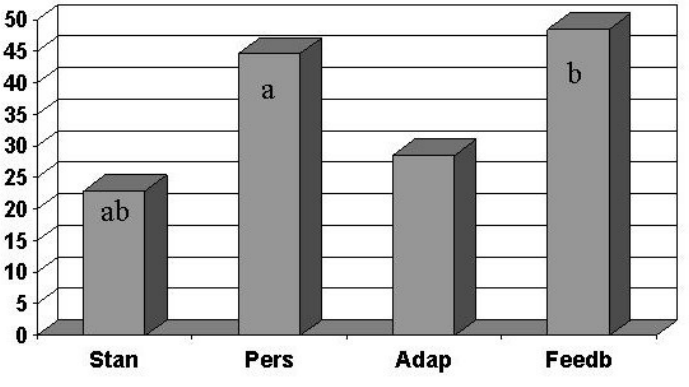
Note: Means with the same superscript differ significantly (p<.05).

With regard to the extent to which participants recognized their own opinions in the information, the conditions did not differ significantly. The extent to which participants perceived the information as having taken into account who they were, differed significantly, F(3,194)=3.48, p=.017. Contrast analyses showed that

participants in the PERS condition and in the FEED condition scored significantly higher ($p<.05$) than those in the STAN condition. In addition, scores in the ADAP condition were significantly lower ($p<.05$) than the scores in the FEED condition.

### 3.2 Condition Effects on Quitting Activity After Four Months

Of the 141 participants who returned the four-month follow-up questionnaire, 25.6% reported having been engaged in an attempt to quit following the lab assessment or being engaged in an attempt to quit at that time. To test the effects of condition on quitting activity, a logistic regression analysis was performed using condition as the independent variable, quitting activity (yes/no) as the dependent variable, and as covariates Gender, Age, Number of cigarettes smoked a day, and Intention to quit at pretest. To start with, several interactions of condition with pretest measures were tested. However, no significant interactions ($p>.20$) of condition, on the one hand, and gender, age, number of cigarettes smoked a day, number of years the person smoked, self-efficacy, intention and arousal experienced at pretest, on the other hand, were found. The change test indicated that the addition of the variable Condition to the covariates significantly improved the model, $X^2$ (3, N=141)=8.20, p=.042. Contrast analyses showed that the proportions of participants (Figure 1) in the PERS condition (44.7%) and in the FEED condition (48.5%) who made an attempt to quit, were significantly larger than the proportion in the STAN condition (22.9%). The percentage in the ADAP condition who attempted to quit (28.6%) did not differ significantly from that in the STAN condition.




*Percentages of quitting attempts in the information conditions as assessed after four months. Stan=standard condition; Pers=personalization condition; Adap=adaption condition; Feedb=feedback condition. Bars with the same superscripts differ significantly ($p<.05$).*

### 3.3 Mediation in the Prediction of Quitting Activity

In order to test to what extent the tailoring evaluations and posttest attitudes mediated the effects of condition on quitting activity, tailoring evaluations and posttest attitudes should be significantly related to condition and to quitting activity. As shown in Table 4, both measures of attitude were significantly related to condition. Furthermore, Affective attitude, but not Cognitive attitude, was significantly related to quitting activity as

indicated by the significant improvement of the model, $X^2$ (3, N=141)=10.62, p=.001. When condition was entered in this model including Affective attitude, the improvement test approached significance, $X^2$ (3, N=141)=6.34, p=.096. Thus, only slight changes in $X^2$ and p-value occurred, indicating a minimal mediation effect of Affective attitude. Furthermore, the two tailoring evaluation items that were significantly related to condition were entered in the logistic regression analyses to predict quitting activity. Entering the items improved the model significantly ($X^2$ (3, N=141)=10.92, p=.004) owing to the significant contributions of both items as indicated by the Wald tests. When condition was entered in this model, the improvement test was no longer significant, $X^2$ (3, N=141)=4.38, p=.22. Thus, the effect of condition on quitting activity was mediated by the scores on the tailoring evaluation items.

## 4 Discussion

The present study was a first attempt to develop a theory of tailoring information to individuals' characteristics, by testing potential working mechanisms separately and assessing the proposed mediating process of self-referent encoding. The main result was that personalization and feedback led to significantly more quitting activity than did the standard information only. Thus, incorporating small pieces of information on a person in a standard text - comprising no more than 800 words - increased the persuasive power of the text: it doubled the number of participants who reported quitting activity during or after four months. Furthermore, the data showed that the self-report of self-referent encoding mediated the effect of both working mechanisms on behavior. This may mean that the process of self-referent encoding is activated by the information on the person, which was incorporated in the standard text. In sum, the results of the present study provide experimental evidence that personalization and feedback can be responsible for the (sometimes) higher effectiveness of tailored intervention, at least in smoking cessation.

A question raised by the present data is why the adaptation of the information was not more effective than the standard information. The concept of adaptation of information is similar to the concept of "target group segmentation", in which general populations are segmented into relevant target groups and in which persuasive information is adapted to specified target group characteristics, such as demographic and behavioral or psychological states [16]. In target group segmentation – as in the presently used adaptation of information – persuasive information is not personalized but still written for a large audience. Two explanations can be offered for the presently found lack of effects of the adaptation condition. Firstly, the information in the adaptation condition did not contain explicit cues that indicated that the information was targeted at the individual. Therefore, the information may not have activated the process of self-referent encoding. This explanation is supported by the self-report data on self-referent encoding: the information in the adaptation condition was not perceived to better take into account "their situation as smokers" and "who they are", than the standard information. Moreover, no interactions between condition and intention to quit at the pretest were found with regard to self-referent encoding and quitting activity. Thus, the idea that the effects of the information in the adaptation condition would depend on the level of involvement did not hold. A second explanation for the lack of

effects found of the information in the adaptation condition may have to do with the operationalization of the working mechanism. The adaptation of the information was based not on empirical data but rather on a common sense approach. There are many possible ways in which information can be adapted to the individual and the results of the present study show that not all are effective. Ideally, adaptation of information is based on match-mismatch studies [8] or outcome studies, which show an interaction between an individual characteristic and certain adaptations of information.

The results of the present study must be interpreted against the background of its following features. Firstly, the participants in the study were all university students. This means that the sample was selective with regard to level of education and age. On the other hand, the sample included students with high and with low intention to quit smoking. Moreover, the students were all daily smokers. In addition, the study showed that even in students who were well acquainted with computer-technology and who may have had insight into the composition of the computer-generated texts, the manipulations were effective. Finally, the investigated psychological mechanism of self-referent encoding is considered to be a fundamental process, which does not depend on demographics. Importantly, the self-report of self-referent encoding has been found to predict quitting activity in naturalistic samples of smokers [17]. Secondly, the process of self-referent encoding was assessed using self-report. This might not be the optimal way to assess a more or less automatic information-processing process. However, the data showed the expected results: in the information conditions which contained cues about the self, more self-referent encoding was reported and exactly those condition led to more quitting activity. Nevertheless, in future studies different and more objective measures of self-referent encoding should be used, such as a recall measure [15]. Thirdly, the information in the conditions was designed to motivate smokers to engage in an attempt to quit by increasing their perceptions of the negative outcomes of smoking and the positive outcomes of quitting. The conditions did not contain information meant to sustain an attempt to quit. Moreover, the main behavioral outcome measure was engaging in an attempt to quit rather than sustained quitting.

Although the psychology of persuasive communication has made massive progress through the years, the possibilities that are offered by computer technology have barely been addressed yet. Although many of the angles to study these new possibilities will be primarily inspired by existing knowledge of (persuasive) communication, the field of tailored communications might be directed at developing explicit theories of tailored communications.

**Acknowledgement.** The present study was funded by a grant of the Royal Dutch Academy of Arts and Sciences.

## References

1. Brug, J., Oenema, A., & Campbell, M. (2003). Past, present, and future of computer-tailored nutrition education. *American Journal of Clinical Nutrition, 77(supplement)*, 1028S-34S.
2. De Vries, H., & Brug, J. (1999). Computer-tailored interventions to promote health promoting behaviours: An introduction to a new approach. *Patient Education and Counseling*, *36*, 99-105.

3. Kreuter, M.W., Strecher, V.J., Glassman, B. (1999). One size does not fit all: The case for tailoring print materials. Annals of Behavioral Medicine, 21, 276-283.
4. Skinner, C.S., Siegfried, J., Kegler, M., & Strecher, V.J. (1993). The potential of computers in patient education. Patient Education and Counseling, 22, 27-34.
5. Skinner, C.S., Campbell, M., Curry, S., Rimer, B., Prochaska, J. (1999). How effective are tailored print communications? Annals of Behavioral Medicine, 21, 290-298.
6. Brug, J., Steenhuis, I., Van Assema, P., & De Vries, H. (1996). The impact of a computer-tailored nutrition intervention. Preventive Medicine, 25, 236-242.
7. Brug, J., Glanz, K., Van Assema, P., Kok, G., & Van Breukelen, G. (1998). The impact of computer-tailored feedback on fat, fruit and vegetable intake. Health Education & Behavior, 25, 357-371.
8. Dijkstra, A., De Vries, H., Roijackers, J., & Breukelen, van, G. (1998). Computerized tailored feedback to stimulate precontemplators to quit smoking: Three basic efficacy questions. Health Psychology, 17, 513-519.
9. Owen, N., Ewins, A.L., & Lee, C. (1989). Smoking cessation by mail: A comparison of standard and personalized correspondence course formats. Addictive Behaviors, 14, 355-363.
10. Skinner, C.S., Strecher, V.J., & Hospers, H. (1994). Physicians' recommendations for mammography: do tailored messages make a difference? American Journal Of Public Health, 84, 43-49.
11. Strecher, V.J., Kreuter, M., Den Boer, D.J., Kobrin, S., Hospers, H.J., Skinner, C.S. (1994). The effects of computer-tailored smoking cessation messages in family practice settings. Journal of Family Practice, 39, 262-270.
12. Kluger A.N., DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis and a preliminary feedback intervention theory. Psychological Bulletin, 119, 254-281.
13. Oenema, A., & Brug, J. (2003). Feedback strategies to raise awareness of personal dietary intake: Results of a randomized controlled trial. Preventive Medicine, 36, 429-439.
14. Rogers, T.B., Kuiper, N.A., & Kirker, W.S. (1999). Self-reference and the encoding of personal information. In R.F. Baumeister (Ed.), The self in social psychology (pp. 372-401). Psychology Press: Philadelphia.
15. Symons, C.S., & Johnson, B.T. (1997). The self-reference effect in memory: A meta-analysis. Psychological Bulletin, 121, 371-394.
16. Ahmad, R. (2003). Benefit segmentation: a potentially useful technique of segmenting and targeting older consumers. International Journal of Market research, 45, 373-388.
17. Dijkstra, A. (1999). Are computer-tailored interventions more effective than standardized interventions? A critical test. Presentation at the 13th conference of the Europen Society of Health Psychology, Florence, Italy.
18. Dijkstra, A., & De Vries, H. (1999). The development of computer-generated tailored interventions in smoking cessation. Patient Education and Counseling, 36, 193-203.
19. Dijkstra, A., De Vries, H., Roijackers, J., & Breukelen, van, G. (1998). Computerized tailored feedback to stimulate precontemplators to quit smoking: Three basic efficacy questions. Health Psychology, 17, 513-519.
20. Owen, N., Ewins, A.L., & Lee, C. (1989). Smoking cessation by mail: A comparison of standard and personalized correspondence course formats. Addictive Behaviors, 14, 355-363.