Process evaluation of FATaintPHAT, a computer-tailored intervention to prevent excessive weight gain among Dutch adolescents

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SUMMARY

Process evaluations can help us to better interpret intervention effects and provide guidance in improving interventions. This study describes the use and appreciation of FATaintPHAT, a computer-tailored intervention to prevent excessive weight gain in adolescents and link these data to the intervention effects. Use and appreciation were assessed among students (12–13 years old) from the intervention group of the FATaintPHAT evaluation study, using computer log (n = 458) and questionnaire data (n = 233, 48% response). Differences in use and appreciation between socio-demographic groups (gender, education, ethnicity, weight category), and associations with behavioural outcomes were analysed using descriptive and regression analyses. The results showed that a majority of the students (81%) was exposed to all intervention modules and 73% reported to have put the advice into practise. Half and one-third of the students appreciated the tailored advice positively and neutrally, respectively. Students attending vocational training appreciated FATaintPHAT better than students attending university preparation education. No associations were found between behavioural outcomes with appreciation and use. In conclusion, the school-based FATaintPHAT intervention was used and appreciated well among adolescents. The fact that the intervention was appreciated better among the lower compared with higher educated students indicates that the technique of computer-tailoring is also suitable for lower educated students.

Trial registration: Netherlands Trial Registry, ISRCTN 15743786.

Key words: process evaluation; computer-tailored; adolescent; overweight

BACKGROUND

Computer-tailoring has proved to be a promising health communication technique to promote a healthy diet and probably also physical activity among adults (Kroeze et al., 2006; Neville et al., 2009a, 2009b). Evidence for the efficacy and appreciation of the technique for promoting healthy dietary and physical activity behaviours among adolescents is scarce, since only few stand-alone computer-tailored interventions for adolescents have been developed and evaluated (Haerens...
et al., 2009). Computer-tailoring is increasingly being used as a technique to match behavioural change information to the unique characteristics of a person (Brug et al., 2003). Provision of personally relevant and individualized health education information is likely to be better appreciated and processed than generic information (Brug et al., 2003). In this paper, we will describe the use and appreciation of FATaintPHAT, a stand-alone computer-tailored intervention for adolescents who aims to prevent excessive weight gain by improving dietary, physical activity and sedentary behaviours (Ezendam et al., 2007). However, results of the effect evaluation study showed no effects for body mass index (BMI), waist circumference or percentage overweight. Regarding the targeted behaviours, favourable effects were found for dietary intake (sugar-sweetened beverages, snacks, fruits and vegetables), but unfavourable effects for physical activity (sports and step count). No effects were found for whole wheat bread consumption (as a proxy for fibre intake), general physical activity, active commuting to school and sedentary behaviour (Ezendam et al., 2012).

Evaluating computer-tailored interventions among adolescents on process level factors such as use and appreciation is important to help us interpret the intervention effects and guide improvement of interventions to increase intervention effectiveness (Bartholomew et al., 2006). In addition, research into the use and appreciation among specific socio-demographic subgroups can provide further insight into the usability of the technique of computer-tailoring among such specific groups. This insight can inform specific targeting of interventions or inform further tailoring on socio-demographic characteristics.

Use and appreciation of an intervention are important process level factors to study, since these are prerequisites for active information processing which is necessary for achieving behaviour change (Hawkins et al., 2008; Petty et al., 2009). Information is more likely to be actively and thoughtfully processed when it is perceived as personally relevant (Campbell et al., 1999, 2002; Petty et al., 2009). Messages that are actively processed tend to be retained for a longer period of time and are more likely to lead to permanent attitude change (Hawkins et al., 2008). Furthermore, the effectiveness of computer-tailoring has been attributed to the fact that tailored feedback is processed more intensively, contains less redundant information, and is appreciated better than more general feedback (Brug et al., 2003). Earlier research suggests that personal relevance, individualization and interestingness mediate intervention effects of a tailored nutrition intervention (Oenema et al., 2005). Given these potential working mechanisms, a higher use and appreciation are regarded as important and possibly associated with more favourable intervention effects. In more comprehensive school-based interventions which sometimes included computer-tailoring, appreciation has been identified as a possible mediator or a determinant of the intervention effects (Sandvik et al., 2005; Wind et al., 2008; Tak et al., 2009).

This study presents the results of the process evaluation of FATaintPHAT. The specific aims of this study were to assess:

(i) Students’ use (number of students who finished specific modules and the whole intervention, printed the tailored advice, discussed the advice with parents/peers, how well advice was read, put the advice into practise) and appreciation (liking, personal relevance, usefulness, interestingness, comprehensiveness of information, novelty of information, length, usability, and lay-out of the website) of FATaintPHAT.

(ii) Differences in use and appreciation according to socio-demographics (gender, education, ethnicity and weight category).

(iii) Associations of use and appreciation with the behavioural outcomes of FATaintPHAT at 4-months follow-up.

METHODS

Study design

This paper reports on the process evaluation conducted in the intervention group of the FATaintPHAT intervention evaluation trial conducted between 2006 and 2009. Details about the study design and the intervention are described elsewhere (Ezendam et al., 2007). The cluster randomized trial and its procedures were approved by the Medical Ethics committee of the Erasmus MC.

Participants and recruitment

Students were recruited in a two-step procedure. First, an invitational letter or email was
Teachers received a teacher manual including intentions (Gollwitzer, 1999) was used to from the Theory of Planned Behaviour (Ajzen, multi-theoretical approach, integrating insights 1991) on how to organize social support. A behaviour to improve self-efficacy, and sug
gestion and instructions on how to perform/change change attitudes, prompts for barrier identifica
ation and norms (normative feedback), and with behaviour of peers (social comparison), prompts for intention 
formation, decisional balance information to change attitudes, prompts for barrier identification and instructions on how to perform/change a behaviour to improve self-efficacy, and suggestions on how to organize social support. A multi-theoretical approach, integrating insights from the Theory of Planned Behaviour (Ajzen, 1991), the Precaution Adoption Process Model (Weinstein et al., 1998) and implementation intentions (Gollwitzer, 1999) was used to inform the intervention. The intervention was implemented by school teachers (n = 19). Teachers received a teacher manual including instructions on the implementation schedule, on the content and procedure of working with the website itself, and on troubleshooting.

Measurements
Use of the intervention, operationalized as the number of students who completed all intervention modules (Steckler and Linnan, 2002), and completion of each intervention module was measured objectively, based on computer log data. The process evaluation questionnaire was administered directly after the final module of the intervention on fibre consumption. Completion took 5–10 min and was supervised by a teacher. The process evaluation questionnaire consisted of 24 items. Different aspects of use of the tailored feedback were assessed with 6 items: ‘Did you print your advice?’ [no (−1); yes, of a few modules (0); yes, everything (1)], ‘Did you discuss your personalized advice with your parents?’ [no (−1); yes, of a few modules (0); yes, everything (1)], ‘Did you discuss your personalized advice with peers?’ [no (−1); yes, of a few modules (0); yes, everything (1)], and ‘How well did you read the advice?’ [very poor (−2); very well (2)]. Participants were also asked whether they followed the suggestions given in the advice ‘Did you put the advice into practice?’ [no (−1); to some extent (0); yes (1)].

Various dimensions of appreciation of the content of the tailored advices were assessed with the following items, measured on a five-point bipolar scale from −2 to +2: liking (‘What did you think of the advice given?’: did not like it at all; liked it very much), personal relevance (‘Did you think the advice given was specially meant for you’: absolutely not; absolutely yes) and usefulness of the information (‘Did the advice contain a lot of useful information?’: absolutely not; absolutely yes). These questions were asked for each module (sugar-sweetened beverages, sedentary behaviour, snacks, fruits, physical activity, vegetables, fibre and weight balance). An overall score for liking, personal relevance and usefulness of information was computed as an average of the ratings for all modules, because ratings for the different modules were very comparable. Cronbach’s alpha’s were 0.91 for the linking and personal relevance scores and 0.92 for the usefulness of information scores. In addition, more general aspects of the FATaintPHAT intervention and its content were evaluated by

The FATaintPHAT intervention
FATaintPHAT is an Internet-delivered intervention that was implemented by school teachers during 8 lessons of 15 minutes each, addressing the topic of weight management and energy balance and the following behaviours: consumption of sugar-sweetened beverages, snacks, fruits, vegetables and fibre consumption, physical activity, and sedentary behaviours (television and computer use) in separate modules. Each module consisted of a brief introduction to the topic with information about the behaviour-health link, an assessment of behaviour and determinants, individually tailored feedback and an option to formulate an implementation intention to prompt specific goal setting and action planning. The feedback could be printed and included several elements: behavioural feedback, comparing the student’s behaviour with guidelines for that behaviour (normative feedback), and with behaviour of peers (social comparison), prompts for intention formation, decisional balance information to change attitudes, prompts for barrier identification and instructions on how to perform/change a behaviour to improve self-efficacy, and suggestions on how to organize social support. A multi-theoretical approach, integrating insights from the Theory of Planned Behaviour (Ajzen, 1991), the Precaution Adoption Process Model (Weinstein et al., 1998) and implementation intentions (Gollwitzer, 1999) was used to inform the intervention. The intervention was implemented by school teachers (n = 19). Teachers received a teacher manual including instructions on the implementation schedule, on the content and procedure of working with the website itself, and on troubleshooting.
Adapted version of the Flemish validated questionnaire (Philippaerts et al., 2006).

Questions on demographics included gender, age, educational level (vocational versus pre-university) and ethnicity. Ethnicity was defined according to Statistics Netherlands as either Western (both parents born in Europe, North-America, Oceania, Indonesia or Japan) or non-Western (at least one parent born elsewhere). Height was measured without shoes using a Seca 225 mobile height rod with an accuracy of 0.1 cm. A calibrated electronic digital floor scale (SECA 888 class III) was used to measure the body weight with an accuracy of 0.2 kg. BMI was calculated as weight (kilograms) divided by height squared (meters). Weight category was based on the IOTF cut-off points (Cole et al., 2000).

**Analyses**

Descriptive statistics were used to describe the study sample, as well as use and appreciation of the intervention (use, liking, personal relevance, usefulness, interestingness, comprehensiveness, novelty of information, length, usability, lay-out, printed advice, discussed with parents/peers, how well advice was read and put advice into practise). Possible differences in gender, education, ethnicity and weight category between participant who did or did not fill out the process evaluation questionnaire were assessed using logistic regression analysis.

Multiple multilevel linear and logistic regression analyses were conducted to test differences in use and the appreciation variables (as dependent variables), according to socio-demographic factors: education [pre-university (1) versus vocational (0)], gender [girls (1) versus boys (0)], ethnicity [non-Western (1) versus Western (0)] and weight category [overweight (1) versus normal weight (0)] (independent variables). The data of the five-point scales were checked for normality before inclusion as dependent variable in the regression models.

In addition, multiple multilevel linear and logistic regression analyses were conducted to assess whether use and a selection of appreciation variables (liking, personal relevance, usefulness, interestingness, put advice into practise and novelty of information; as independent variables) were associated with energy-balance related behaviours (consumption of sugar-sweetened beverages, snacks, fruits,
vegetables and whole wheat bread, physical activity and sedentary behaviours) at 4 months follow-up adjusted for baseline levels. Analyses were adjusted for: education, gender, ethnicity and weight category. The independent variables were checked for multicollinearity (i.e. \( r \geq 0.9 \)). For all analyses a significance level of 0.05 was used. Multilevel regression accounts for the clustered variances between schools. Analyses were performed using SPSS version 17.0 and MLwiN 2.02 (multilevel analyses).

RESULTS

Students’ characteristics
In Table 1, the student characteristics are presented for the 233 students who completed the process evaluation questionnaire (response of 48%). About 45% of our sample were girls, mean age was 12.7 year, 36% was from non-Western ethnicity and 66% attended vocational training. We did not find differences between students who did or did not fill out the process evaluation questionnaire for gender, education, ethnicity or weight category.

Students’ use of FATaintPHAT
The intervention was completed by 81% of the students. The subsequent intervention modules were completed by the following percentage of students: energy balance: 97%; sugar-sweetened beverages: 97%; sedentary behaviour: 96%; snacks: 94%; fruits: 92%; physical activity: 87%; vegetables: 86%; and fibre: 81%. Table 2 shows that of the students who completed the process evaluation questionnaire, one-third reported to have printed the advice, three quarter reported to have followed the suggestions given in the advice, 40% discussed part or all of the content with a parent and also 40% discussed it with peers. In addition, two-thirds of the students reported to have read the advice well or very well and a quarter reported to have read it neither good nor bad.

Students’ appreciation of FATaintPHAT
The results regarding the appreciation variables are shown in Table 2. Around half of the students liked the tailored advice, thought it was personally relevant, found the information useful and interesting and thought it was easy to comprehend, while one-third was neutral (not positive/not negative) about the intervention they received. A large majority (83%) of the students indicated that they had learned some or many new things from the intervention. More than half (56%) rated the advices as too long and 37% rated the length as fine (not too long/not too short). The lay-out was well appreciated by 58% of the students. The average grade on a scale from 1 to 10 the students assigned FATaintPHAT was 7.1.

Differences in use and appreciation by socio-demographic factors
In general, students in vocational training appreciated the intervention better (liked the feedback better, found it more useful and interesting and reported they learned more new things) than pre-university students (Table 3). Moreover, they reported more often to have discussed the information with their parents and have read it better compared with pre-university students. Pre-university students perceived it as longer and comprehended the information better.

Differences in appreciation according to gender, ethnicity and weight category were less pronounced. Girls more often reported to have learned new things and they read the advice better compared with boys. Students of non-Western ethnicity reported to comprehend the information better than other students. Students who were overweight found the information more useful than normal weight students.
We did not find significant associations of any of the process measures (use, liking, personal relevance, usefulness, interestingness, put advice into practise and novelty of information) with behaviour changes (i.e. post-test behaviour scores adjusted for baseline levels).

**DISCUSSION**

**Main results**

Large majorities of the students were exposed to all the modules of the intervention and reported to have put the advice into practise. In general, about half of the students reported to have appreciated the tailored advice, and less than one-fifth reported negative appreciation. Vocational students appreciated FATaintPHAT better than the pre-university students. No associations were found between use and appreciation scores and the behavioural outcomes at 4 months follow-up.

**Interpretation**

Computer-tailoring is a promising health communication technique to change dietary and possibly also physical activity behaviours in adults (Kroeze et al., 2006; Neville et al., 2009a, 2009b; Enwald and Huotari, 2010; Krebs et al., 2010). FATaintPHAT is one of the first studies evaluating a stand-alone computer-tailored programme for adolescents. This study can therefore extend our knowledge about the usability and possible working mechanism of computer-tailoring for adolescents. FataintPHAT was effective in initiating changes in sugar-sweetened beverages, snacks and vegetable consumption (Ezendam et al., 2012). Computer-tailored information is thought to be more personally relevant, useful, interesting and new than generic information (Hawkins et al., 2008). The students who used FATaintPHAT did indeed like the information, thought the tailored advices were relevant for them, were useful, interesting and new. Therefore, the supposed working mechanisms that add to the effectiveness of computer-tailoring might be relevant for adolescents as well. Our results show that about 40% of the students discussed their advice with their parents and also 40% discussed it with peers. This may be an indication that students to some extent process the information actively which is necessary for behaviour change (Hawkins et al., 2008; Petty et al., 2009).

Moreover, about three quarters of the students reported to have put their advice into practise. A study of Haerens et al. (Haerens et al., 2009) on a 1-h computer-tailored physical

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**Table 2**: Description of students’ appreciation of the intervention program and its contents (n = 233)

<table>
<thead>
<tr>
<th>Appreciation content tailored advice</th>
<th>Mean (SD)</th>
<th>Answer categories (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>−2 −1 0 1 2</td>
</tr>
<tr>
<td>Liking [not at all (−2)–very (+2)]</td>
<td>0.51 (0.77)</td>
<td>3 9 25 40.8 42.5 10.3</td>
</tr>
<tr>
<td>Personal relevance [not at all (−2)–very (+2)]</td>
<td>0.35 (0.83)</td>
<td>3 4 9.9 43.8 33.0 9.9</td>
</tr>
<tr>
<td>Useful information [not at all (−2)–very (+2)]</td>
<td>0.56 (0.83)</td>
<td>3 9 2.5 39.1 40.3 14.2</td>
</tr>
<tr>
<td>Interestingness [not at all (−2)–very (+2)]</td>
<td>0.38 (1.08)</td>
<td>7 7 8.2 37.8 31.3 15.0</td>
</tr>
<tr>
<td>Comprehensiveness [very difficult (−2)–very easy (+2)]</td>
<td>0.67 (1.08)</td>
<td>5.2 5.2 33.0 30.5 26.2</td>
</tr>
<tr>
<td>Novelty of information (no, some, yes)</td>
<td>0.08 (0.65)</td>
<td>17.2 57.5 25.3</td>
</tr>
<tr>
<td>Appreciation FATaintPHAT programme</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length [too short (−2)–too long (+2)]</td>
<td>0.76 (0.98)</td>
<td>2.1 4.3 36.9 29.2 27.5</td>
</tr>
<tr>
<td>Usability [very difficult (−2)–very easy (+2)]</td>
<td>1.01 (0.89)</td>
<td>1.3 3.0 21.9 41.2 32.6</td>
</tr>
<tr>
<td>Lay-out [very bad (−2)–very good (+2)]</td>
<td>0.59 (1.02)</td>
<td>5.6 5.2 31.8 39.5 18.0</td>
</tr>
<tr>
<td>Use tailored advice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printed advice (no, few modules, everything)</td>
<td>−0.45 (0.79)</td>
<td>63.9 17.2 18.9</td>
</tr>
<tr>
<td>Discussed with parents (no, partly, everything)</td>
<td>−0.42 (0.76)</td>
<td>59.2 24.0 16.7</td>
</tr>
<tr>
<td>Discussed with peers (no, partly, everything)</td>
<td>−0.46 (0.71)</td>
<td>58.4 29.2 12.4</td>
</tr>
<tr>
<td>How well read advice [very badly (−2)–very well (+2)]</td>
<td>0.66 (1.10)</td>
<td>8.2 2.6 27.0 39.9 22.3</td>
</tr>
<tr>
<td>Put advice into practise (no, some, yes)</td>
<td>−0.06 (0.69)</td>
<td>27.0 51.9 21.0</td>
</tr>
</tbody>
</table>

SD, standard deviation.

**Association of use and appreciation with behavioural outcomes**

We did not find significant associations of any of the process measures (use, liking, personal relevance, usefulness, interestingness, put advice into practise and novelty of information) with behaviour changes (i.e. post-test behaviour scores adjusted for baseline levels).
activity intervention for adolescents showed that only about one-third was planning to put the advice into practise. These differences in using the suggestions provided in the advice might be explained by the fact that FATaintPHAT offers a choice on a variety of behaviours to change (dietary, physical activity and sedentary behaviours), while the intervention of Haerens et al. (Haerens et al., 2009) only focussed on physical activity. Furthermore, the

Table 3: Results of multiple regression analyses with the process measures as dependent and socio-demographic factors as independent variables (n = 233)

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Educational level (Vocational = 0; Pre-university = 1)</th>
<th>Gender (Boy = 0; Girl = 1)</th>
<th>Ethnicity (Western = 0; non-Western = 1)</th>
<th>Weight category (normal = 0; overweight = 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appreciation content tailored advice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liking [not at all (−2)–very (+2)]</td>
<td>b</td>
<td>−0.42 (−0.66; −0.19)</td>
<td>0.06 (−0.16; 0.27)</td>
<td>0.09 (−0.14; 0.32)</td>
</tr>
<tr>
<td>Personal relevance [not at all (−2)–very (+2)]</td>
<td>b</td>
<td>−0.22 (0.48; 0.04)</td>
<td>0.08 (−0.16; 0.31)</td>
<td>−0.01 (−0.27; 0.25)</td>
</tr>
<tr>
<td>Useful information [not at all (−2)–very (+2)]</td>
<td>b</td>
<td>−0.32 (−0.59; −0.05)</td>
<td>0.02 (−0.20; 0.25)</td>
<td>0.11 (−0.14; 0.36)</td>
</tr>
<tr>
<td>Interestingness [not at all (−2)–very (+2)]</td>
<td>b</td>
<td>−0.54 (−0.87; −0.22)</td>
<td>0.17 (−0.12; 0.46)</td>
<td>−0.02 (−0.34; 0.30)</td>
</tr>
<tr>
<td>Comprehensiveness [very difficult (−2)–very easy (+2)]</td>
<td>b</td>
<td><strong>0.55 (0.18; 0.92)</strong></td>
<td>−0.03 (−0.32; 0.26)</td>
<td><strong>0.36 (0.03; 0.68)</strong></td>
</tr>
<tr>
<td>Novelty of information (0 no; 1 yes)</td>
<td>OR</td>
<td><strong>0.29 (0.13; 0.66)</strong></td>
<td><strong>2.72 (1.21; 6.12)</strong></td>
<td>0.82 (0.35; 1.92)</td>
</tr>
<tr>
<td>Appreciation FATaintPHAT Length [too short (−2)–too long (+2)]</td>
<td>b</td>
<td><strong>0.42 (0.14; 0.71)</strong></td>
<td>−0.24 (−0.50; 0.02)</td>
<td>0.04 (−0.24; 0.32)</td>
</tr>
<tr>
<td>Usability [very difficult (−2)–very easy (+2)]</td>
<td>b</td>
<td>−0.06 (−0.33; 0.22)</td>
<td>−0.10 (−0.34; 0.15)</td>
<td>0.20 (−0.07; 0.47)</td>
</tr>
<tr>
<td>Lay-out [very bad (−2)–very good (+2)]</td>
<td>b</td>
<td>−0.17 (−0.49; 0.15)</td>
<td>−0.02 (−0.30; 0.27)</td>
<td>−0.04 (−0.35; 0.27)</td>
</tr>
<tr>
<td>Use program and tailored advice Printing advice (0 no; 1 yes)*</td>
<td>OR</td>
<td><strong>0.37 (0.19; 0.73)</strong></td>
<td>1.47 (0.82; 2.62)</td>
<td>0.57 (0.30; 1.08)</td>
</tr>
<tr>
<td>Discussed with parents (0 no; 1 yes)</td>
<td>OR</td>
<td><strong>1.08 (0.58; 2.02)</strong></td>
<td>0.93 (0.53; 1.64)</td>
<td>0.60 (0.32; 1.13)</td>
</tr>
<tr>
<td>Discussed with peers (0 no; 1 yes)</td>
<td>OR</td>
<td><strong>1.08 (0.58; 2.02)</strong></td>
<td>0.93 (0.53; 1.64)</td>
<td>0.60 (0.32; 1.13)</td>
</tr>
<tr>
<td>How well read advice [very badly (−2) – very well (+2)]</td>
<td>b</td>
<td><strong>−0.41 (−0.75; −0.07)</strong></td>
<td><strong>0.36 (0.05; 0.66)</strong></td>
<td>−0.04 (−0.38; 0.30)</td>
</tr>
<tr>
<td>Put advice into practice (0 no; 1 yes)</td>
<td>OR</td>
<td><strong>1.05 (0.52; 2.11)</strong></td>
<td>1.18 (0.63; 2.22)</td>
<td>0.72 (0.37; 1.42)</td>
</tr>
<tr>
<td>Reach (completed program: 0 no; 1 yes)</td>
<td>OR</td>
<td><strong>1.54 (0.29; 8.32)</strong></td>
<td>1.24 (0.66; 2.31)</td>
<td>0.63 (0.33; 1.20)</td>
</tr>
</tbody>
</table>

b, unstandardized b; OR, odds ratio; 95% confidence Intervals between brackets. Bold values indicate a significant association (P<.05).

*Model does not converge.
appreciation of FATaintPHAT as a whole was comparable with the results of the physical activity computer-tailored intervention of Haerens et al. (Haerens et al., 2009), who found that about half of the students thought the tailored advice was interesting and about 40% perceived it personally relevant, credible and easy to use. The physical activity advice of Haerens et al. was perceived as too long by 50% of the students.

In general, lower educated people have less healthful lifestyles (Roos et al., 1998; Hanson and Chen, 2007) compared with higher educated people. This was also the case among the students in our sample (unpublished data). Therefore, it is of specific importance that vocational students will use and appreciate an intervention aimed at improving their health behaviour. FATaintPHAT was completed equally well by higher and lower educated students. Previous studies have shown that respondents with a lower educational level were more appreciative of tailored health information than general health information (Brug and van Assema, 2000; Martens et al., 2006). Accordingly, in our study the vocational students liked the modules better than the pre-university students and thought it was more useful. At the same time, the pre-university students perceived the advice as easier than the vocational students. An explanation for these findings might be that the information was already familiar to the pre-university students. This explanation is supported by our results on the novelty and interestingness of the information, where the vocational students reported to have learned more new things and found the information more interesting compared with the pre-university students. These results suggest that in general computer-tailoring has the potential to be an appreciated strategy by lower educated students and that the FATaintPHAT intervention is applicable among both higher and lower educated students.

We did not find associations between use and appreciation with the behavioural outcomes. This may be largely due to the fact that we could not perform mediation analyses because the control group did not provide data about the appreciation of the regular curriculum. Of the studies in which an association was found between appreciation variables and intervention effects (Oenema et al., 2005; Wind et al., 2008; Tak et al., 2009), most studies used a stronger design (Oenema et al., 2005; Tak et al., 2009). In addition, these studies were different from FATaindPHAT with respect to their goal and target population. Tak et al. (Tak et al., 2009) focussed on increasing availability of fruit and vegetables at primary schools and Wind et al. (Wind et al., 2008) used a multi-component intervention at primary schools to increase fruit and vegetable consumption including an availability component, computer-tailored education and involvement of parents. The intervention of Oenema et al. (Oenema et al., 2005) targeted self-selected adults who used the Internet-based intervention at home. Therefore, the differences between the results of these studies and our study could possibly be explained by differential effects of environmental intervention versus more cognitive interventions or by differences in baseline motivation of the respondents. If we compare the process outcomes with the effect outcomes (Ezendam et al., 2012), we can conclude that the favourable effects on dietary behaviours are supported by the positive rating and use of FATaintPHAT. However, the unfavourable and absence of effects for physical activity and sedentary behaviour cannot be explained by the appreciation and use of the intervention.

**Strengths and limitations**

The strength of this study is the use of an innovative intervention strategy (computer-tailoring) among adolescents and the use of computer-log data to assess use. A limitation of the study is a possible selective sample of those who completed the process evaluation questionnaire, since only 48% of the intervention users completed the questionnaire. This limits the generalizability of the findings to other samples. If students with a low appreciation of the intervention did not complete the process evaluation questionnaire, our results may be an overestimation of true appreciation. However, we found that overweight adolescent more often completed the process evaluation, while no significant differences were found for gender, educational level or ethnicity. Since being overweight was not significantly related to appreciation of the intervention it is not likely that this selected sample leads to biased results. A second limitation is the absence of generic control group process outcomes, so results cannot explain specific characteristics of a
health promotion program for female blue-collar workers: health works for women. Preventive Medicine, 34, 313–323.


