A nutrition education program for employed women on maintaining a healthy weight was developed and evaluated. Delivery of eight messages (two per week for four weeks) by electronic mail was tested for effectiveness.

The subjects were 243 members of the Oregon State University Office and Personnel Association who were randomly assigned to three experimental groups. Group #1 received hard copies of the messages, group #2 received hard copies along with a weekly electronic tip on weight management, and group #3 received the messages by electronic mail (e-mail).

An evaluation survey was developed to assess: 1) Participants' stage of change regarding fat in the diet, 2) Participants' social support network for weight maintenance, 3) Reactions to the program, 4) Impact of the program on positive behavior regarding weight control, and 5) Demographics. The survey was sent by campus mail about three weeks after the program.

The evaluation was completed by 80.2% of participants. The nine male respondents and the two gender-unidentified respondents were not included in
the data analysis to assure a total female population. A total of 181 surveys were analyzed (74.5%). The mean age of female respondents was 47.8 ± 13.3.

Although it was hypothesized that electronic delivery of the program and/or supplementing the hard copy/print program with brief electronic tips would be associated with higher order stages of change (Transtheoretical Model), the results from this study did not support the hypotheses. There was no significant difference in stage of change among participants in the three modes of delivery. The messages appeared to have the greatest impact on women in the action and preparation stages. They tended to make more positive changes (i.e. reading food labels) than women in the maintenance, contemplation, and precontemplation stages.

Mode of delivery did not appear to make a difference in whether the women looked forward to the messages, reactions to message length, how many were read, or the resulting knowledge or behavior change. Therefore, it may not be critical to program effectiveness. Women in the electronic group, however, were more certain that they received all eight messages and were more apt to ask questions of the researcher. The potential cost savings, convenience, and ease of quick communication make it a more attractive option. Access to the technology and participant preference are equally important factors.
On-Line to Healthy Weighs:
Electronic Messages for Employed Women
on Maintaining a Healthy Weight

by

Angelique S. Sullivan

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APPROVED:

Major Professor, representing Nutrition and Food Management

Chair of Department of Nutrition and Food Management

Dean of Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature authorizes release of my thesis to any reader upon request.

Angelique S. Sullivan, Author
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ON-LINE TO HEALTHY WEIGHS:
ELECTRONIC MESSAGES FOR EMPLOYED WOMEN 
ON MAINTAINING A HEALTHY WEIGHT

INTRODUCTION

As we approach the year 2000, women's health issues have become a public health priority. The health research infrastructure has recognized the need for greater attention to women’s health. It is widely accepted that diet influences health (USDA, USDHHS, 1995). It is the position of the American Dietetic Association that because of many biological, social, and political factors, women are at unique risk for major nutrition-related diseases, certain cancers, osteoporosis, diabetes, and weight-related problems.

Overweight confers a variety of health risks on women. These risks include heart disease, hypertension, dyslipidemia, diabetes, gallstone formation, and cancers of the reproductive organs. In addition, women are vulnerable to social stigmas associated with being overweight. National surveys estimate that 34.9% of women are overweight (Kuczmarski et al., 1994). Despite the known risks, the prevalence of overweight women in America is increasing.

Weight maintenance strategies that help women achieve a weight that supports good health are important. Worksites offer an attractive setting for nutrition intervention activities (Contento et al., 1995). While most programs offer direct approaches, there has been an increase in the use of minimal contact methods such as self instructional materials (Peterson et al., 1985).
The use of new communications technology in the nutrition community is now emerging. The potential for enhanced communication efforts is starting to be explored. Electronic mail as a delivery method for informal nutrition education has been limited.

A needs assessment with women from the Oregon State University Office and Personnel Association (OPA), an association of staff employees on campus, revealed that members were interested in weight control. The five roundtable participants indicated that educational messages should be short, attention grabbing and cover a variety of topics, possibly under one theme. All OPA members had access to electronic mail.

Many models have been used to explain, predict and modify behavior. Use of a theoretical framework in the design of educational programming is a focus of nutrition education research (Glanz et al., 1990).

Purpose

The purpose of this study was to develop and evaluate the impact of nutrition education messages on maintaining a healthy weight that were delivered to female office employees via electronic mail.
Hypotheses

1. Electronic delivery of messages supplementary to a campus mail program for employed women on maintaining a healthy weight will be significantly associated with higher order stages of change for reducing fat intake.

2. Electronic delivery of a program for employed women on maintaining a healthy weight will be associated with higher order stages of change for reducing fat intake.

Operational Definitions

1. Campus mail program: 4 printed handouts covering 8 topics (1/wk.)

2. Electronic messages supplementary ("Byte"): 4 messages/tips (1/wk.) with sharing opportunity

3. Electronic delivery of program: 8 electronic messages covering 8 topics (2/wk.)
REVIEW OF THE LITERATURE

Women’s Health Issues

Women’s health issues are receiving national attention (Finn and Beatty, 1995, Finn, 1993, Wenger et al., 1993). The 1990 revelation that not enough research was focusing on diseases affecting women sparked criticism (Finn, 1993). The Office of Research on Women’s Health, created at the National Institutes of Health, and the Society for the Advancement of Women’s Health have called for greater attention to women’s health issues (Finn, 1993).


In 1993, The American Dietetic Association (ADA), a leading association of nutrition professionals, launched the Nutrition & Health Campaign for Women. The campaign represents a major national effort to advance research on women’s health and to help adult women understand ways to prevent disease and maintain a healthy body weight (Finn and Beatty, 1995, Finn, 1993). The following issues are being targeted: breast cancer, heart disease, osteoporosis and excess weight.
The Healthy People 2000 report includes reduction of overweight as a national nutrition objective. Specifically, the report sets national objectives in health promotion and disease prevention for the year 2000 (USDHHS, PHS, 1990). The twenty-one nutrition objectives provide the opportunity for nutrition professionals to strategically plan to address the nutrition issues over the next decade (Bronner, 1991). The objective related to overweight is stated: “Reduce overweight to a prevalence of no more than 20% among people aged 20 years and older and maintain prevalence at no more than 15% among adolescents aged 12 through 19 years” (USDHHS, PHS, 1990).

Overweight and Health

While the connection between obesity and mortality is well established, whether there is a similar link for mild overweight has long been a subject of debate. Similarly, the definition of “healthy weight” is controversial (Berg, 1996).

Defining Healthy Weight

The current edition of the Dietary Guidelines for Americans includes a recommendation to “Balance the food you eat with physical activity—maintain or improve your weight” (USDA, USDHHS, 1995). The Dietary Guidelines for Americans, issued jointly by the Department of Agriculture and the Department of Health and Human Services, provide the best advice for Americans about food choices that promote health and prevent disease (USDA, USDHS, 1995).
The weight recommendations of the 1995 guidelines set healthy weight within a body mass index (BMI) of 19 to 24.9 (weight in kilograms divided by height in meters squared). Above this come two ranges for moderately overweight (BMI 25-28.9) and severely overweight (BMI 29+). This definition of healthy weight is not consistent with the National Center for Health Statistic’s definition of overweight as a body mass index of 27.3 for men and 27.8 for women (Kuczmarski et al., 1994).

The previous edition of the Dietary Guidelines (1990) set the basic healthy weight range at a BMI of 19-25, and raised the BMI to 21-27 after age 35 (USDA, USDHHS, 1990). The 1995 edition does not allow an increase in weight with age. Some experts criticize this change, citing evidence that weight of lowest mortality does seem to increase with age (Berg, 1996). However, important findings linking weight gain at all ages to illness and death come from the Nurse’s Health Study. The investigators examined the relationship between BMI and mortality in a cohort of 115,818 middle-aged women. They found that even women whose BMI at mid-life (30-50) was between 23 and 24.9 had a 50% higher risk of having a heart attack than those whose BMI was under 21 (Willett et al., 1995). Further, those who gained as few as 12 pounds after the age of 18 had a 25% greater risk of developing heart disease than women who gained less as they aged. For these reasons, the 1995 weight guidelines specify that even if at the low end of the range for height, it is best to remain at that weight rather than slide up through the healthy range over time (USDA, USDHHS, 1995).
Data from the Nurse’s Health Study supported a direct association between BMI and mortality among women after cigarette smoking and disease related weight loss were factored out (Manson et al., 1995). The investigators reported that the lowest mortality rate for US middle-aged women is found at weights at least 15% below the US average for women of similar age (Manson et al., 1995). Women with a BMI below 25 who had never smoked and whose weight had remained stable since early adulthood were less likely than their counterparts to die early from any cause. Those with a BMI of 19 had the lowest death rate despite several previous studies that detected a slight increase in mortality among the leanest women (Manson et al., 1995). The previous investigations, however, failed to account for factors such as cigarette smoking which is more prevalent among lean individuals (Manson et al., 1995). The findings of the Nurse’s Health Study are particularly powerful because of the 16-year follow-up and the large cohort.

Trends in Overweight

Despite the known medical risks of being overweight, the prevalence of overweight in the United States is escalating, particularly among women and minority groups (Kuczmarski et al., 1994). National estimates of the prevalence of overweight are available from National Health and Nutrition Examination Surveys (NHANES) conducted by the Center for Disease Control’s National Center for Health Statistics. The estimates reported for NHANES III phase 1(1988-91) are based on the BMI for a sample of 8,260 adults 20 years or older.
Between NHANES II (1976-1980) and NHANES III phase I, the percentage of women considered to be overweight increased from 26.5% to 34.9%, with the prevalence increasing with age. In this period, mean weight among women aged 20 to 74 increased by 3.9 kilograms (kg) (Kuczmarski et al., 1994).

Other studies found similar increases in the prevalence of overweight during approximately the same time period. The National Center for Health Statistic's National Health Interview Survey, found that the prevalence of overweight increased from 21.6% in 1983 to 24.0% in 1985 to 27.5% in 1990 (Pianni and Schoenborn, 1990, Schoenborn, 1985). Data on measured heights and weights from the Minnesota Heart Health Program indicate that from 1980 through 1987 the prevalence of obesity (BMI >30) among women aged 25 - 74 years increased by 6.1% (Shah et al., 1991).

**Explanations for Increase in Prevalence of Overweight**

It seems apparent that the goal set by the Healthy People 2000 objective will not be met. The challenge for health professionals is to determine why the pervasive increase in the prevalence of overweight has occurred and how it might be reversed. Factors such as dietary knowledge, attitudes, physical activity levels, and health behaviors have been suggested as likely factors (Kuczmarski et al., 1994).

Americans have changed their food intake patterns. According to data from NHANES III phase 1, average daily calorie intake increased by 100-300 calories since the NHANES II survey (Lenfant and Ernst, 1994). Some experts
hypothesize that overconsumption of low-fat foods may be contributing to the increase in caloric intake (Allred, 1995).

Fat intake, although on the decline, exceeds the USDA's dietary guideline as well as the goal set by Healthy People 2000 of no more than 30% calories from fat (USDHHS, PHS, 1990). Currently, women consume 33.9% of total daily energy from fat (Lenfant and Ernst, 1994). Moderating fat intake is important for weight control because fat, whether from plant or animal sources, contains more than twice the number of calories of an equal amount of protein or carbohydrate (USDA, USDHHS, 1995). Dietary energy consumed in excess of metabolic needs is stored as fat, resulting in weight gain (Bray, 1995). Low fat foods are not necessarily low calorie, however.

McGinnis (1992) reports that despite the merits of physical activity for health and well-being, Americans' relatively sedentary lifestyles have shown little improvement in the past twenty years. Data from the 1991 Behavioral Risk Factor Surveillance System (BRFSS), a population-based, random-digit-dialed telephone survey, confirms the prevalence of sedentary lifestyles (CDC, 1993). Of the 87,433 respondents, 58.5% of adult women reported a sedentary lifestyle. Overall participation in exercise and strenuous activity declined 10% between 1985 to 1990 according to the 1985 and 1990 National Health Interview Surveys of more than 7,000 adults (Robinson and Godbey, 1993).

Other factors contributing to the increase in overweight suggested by experts include the decline in smoking which is associated with weight gain
(Gerace et al., 1991), labor-saving devices, genetics, and cultural factors (Pi-Sunyer, 1994).

**Women’s Attitudes and Behavior Regarding Nutrition and Weight Control**

A large portion of American women are trying to lose weight. Researchers from the Center for Disease Control and Prevention (Center for Chronic Disease Prevention and Health Promotion) and the Food and Drug Administration (Division of Consumer Studies) surveyed 60,590 adults in 38 states and the District of Columbia by telephone in 1989. The researchers found that of the 34,447 women surveyed, 38% were trying to lose weight whereas 28% were trying to maintain weight (Serdula et al., 1993). For women, methods reported included: counting calories (24%), participating in organized weight loss programs (10%), taking diet pills (4%), and fasting for 24 hours or longer (5%). The survey found that 52% of the women reported consuming fewer calories and increasing physical activity (Serdula et al., 1993). The need for broad-scale public education to inform the public about safety and effectiveness of weight-loss practices is recognized by public health authorities (Heaton and Levy, 1995).

Data from the USDA’s 1989-90 Diet and Health Knowledge Survey and the Continuing Survey of Food Intakes by Individuals provide insight into women’s attitudes and behavior regarding weight status and health (Rose, 1994). The surveys found that among a nationally representative sample of
2,232 women meal planners, awareness of health problems associated with being overweight did not lessen the likelihood of being overweight. It was found that women meal planners are generally aware of the relationship between weight and disease, however, not everyone is equally aware of the risk of health problems (Rose, 1994). About three-quarters of women meal planners felt that maintaining a desirable weight was important to them (Rose, 1994).

There continues to be a gap between public awareness about the importance of nutrition and action to improve the diet. Results from the 1993 American Dietetic Association’s Survey of American Dietary Habits, sponsored by Kraft General Foods, show that a growing number of Americans are concerned about good nutrition. Telephone interviews were conducted with 1,000 adults ages 25 and older. As a whole, women continue to place a higher level of importance on nutrition than men. On a 7-point scale, 68% of women aged 35-54 assigned a high rating to a question on personal importance of nutrition versus 45% of men the same age (Morreale et al., 1995).

Although personal concern about nutrition is growing, only 39% of respondents say that they are doing all that they can to achieve a healthful diet. Merely 37% reported taking care in selecting foods. Women aged 35-54 are one of two subgroups that may be more receptive to dietary improvement (Morreale et al., 1995). Compared to a similar survey conducted in 1991, their responses to the question about the personal importance of diet and nutrition showed the greatest increase.
Weight Management Programming

The area of weight management poses an important dilemma for health professionals. A committee of The Food and Nutrition Board of the National Academy of Sciences was coordinated to develop criteria for evaluating weight-management programs (NAS, FNB, 1994). In their report, they organize the wide variety of weight loss programs into three categories:

1. Do-it-yourself programs: These are individually formulated and extremely varied. This category includes any effort by an individual to lose weight by him/herself or with a group of others such as Overeaters Anonymous or with community and work-site programs.

2. Nonclinical programs: These programs are often commercially franchised. Typically they have a structure created by a parent structure and use guidance materials that are prepared in consultation with health-care providers.

3. Clinical programs: These programs may or may not be a part of commercial franchise system. Clinical programs include such services as nutrition, medical care, behavior therapy, exercise, and psychological counseling. They may utilize very-low-calorie diets, medications and surgery. In some, an individual health care professional works alone, and in others, a health care team coordinates their efforts (NAS, FNB, 1994).
Kalodner and De Lucia (1990) report that there are four components of effective weight loss programs: behavior modification, cognitive therapy, social support and nutrition education. The goal of behavioral intervention is modification of daily eating behaviors to produce lasting results. Cognitive factors play a role in eating and contribute to poor eating patterns. The importance of family and friends in weight loss efforts has been established. Nutritional components provide information and teach skills necessary for healthy eating and weight control.

**Nutrition Education**

Nutrition education teaches the skills necessary to interpret information (i.e. food labels) and make informed decisions (Kalodner and DeLucia, 1990). It is important to help people decrease caloric intake while continuing to get the important nutrients needed for health.

In an obesity prevention pilot program for African American mothers and daughters in Chicago, treatment addressed the identification of high- and low-fat foods, how to read food labels and calculate percentage of fat in calories in food, risks of high-fat eating, low-fat planning and preparation and problems associated with obesity (Fitzgibbon et al., 1995). A significant increase over time in nutrition knowledge was noted for the treatment group. Guthrie et al. (1995) contend that educational materials should not only include specific information on the nutrition label but also relate this information to general consumer dietary guidance such as the Dietary Guidelines.
Heaton and Levy (1995) report that dieters need more information that addresses the specifics of individual circumstances and the characteristics of specific products and services. They found that many dieters may consider themselves adequately informed about general weight loss guidelines and therefore seek additional information only when it promises "added form value" beyond what they already know. For example, in recent months, the fat-replacer Olestra has been given media coverage (Lemonick, 1996), and its implications for lowering fat in the diet are new.

Lowering fat in the diet is important for calorie control in weight management (USDA, USDHHS, 1995). The Women's Health Trial, a multi-centered trial to evaluate whether a low fat diet could reduce the incidence of breast cancer, was indeed successful at lowering fat intake of women (Burrows et al., 1993). A series of 20 dietary behavior change sessions focused on teaching the women how to monitor fat consumption, determine the sources of fat in the diet, and identify areas where dietary fat intake could be reduced (Burrows et al., 1993). Other skills taught included food selection and preparation and eating away from the home. The program emphasized increasing consumption of complex carbohydrates. The easiest dietary change appeared to be a reduction in visible fats by using a combination of strategies: replacing high fat spreads with lower fat options or substituting diet margarines and salad dressings for their regular counterparts (Burrows et al., 1993). The findings from the Women's Health Trial can help educators to select the most effective way to focus their messages.
**Exercise**

Exercise appears to be an important component of weight loss and management (Blair et al., 1996, Parham, 1993a). When combined with other lifestyle changes, it is important for the overall reduction of body weight and subsequent maintenance of weight loss (Blair et al., 1996, Zelasko, 1995). Blair reports (1993) that the addition of exercise to diet intervention produces more weight loss than does dieting alone.

**Social Support**

Most weight loss/maintenance programs include some attention to social support. Drop-out rates from weight-reduction programs have been attributed to several factors including limited support from family members (Fowler et al., 1985). Kayman et al. (1990) found that women who maintained a weight loss had more people available for support than did women who regained the weight.

Parham (1993b) states that there is a need to draw on related disciplines in developing strategies for enhancing social support that are applicable to weight management programming. It is not clear how social support relates to weight loss and other health behaviors, but experts hypothesize that it helps buffer stress (Glanz et al., 1990). Many reviews of treatment strategies for weight loss recommend attention to social support (Kaloger, 1990, Parham, 1993b).
A study investigating the influence on employed women of perceived support of family, friends, and coworkers in relation to dietary behavior found that dieting may fail if the dieter does not have the support of influential groups and/or links with information networks (Hertzler and Schulman, 1981).

**Measures of Success**

Experts on the Food and Nutrition Board of the National Academy of Sciences have elucidated the need for a new perspective on obesity-treatment outcomes. They recommend redefining success in the evaluation of weight loss programs:

We recommend that the definition of success that is applied in evaluating weight-loss programs be broadened and made more realistic based on the research findings that small weight losses can reduce the risks of developing chronic diseases. Specifically, the goals of obesity treatment should be refocused from weight loss alone, which is aimed at appearance, to weight management, achieving the best weight possible in the context of overall health (NAS, FNB, 1994).

Determining the variables that are predictive of success and failure of weight loss and maintenance can improve the long-term success rate. Laverty and Loewy (1993) conducted a study to identify variables associated with weight changes among a large group of obese individuals after participation in a behavioral weight loss program. They found that persons who exercised, had the support of a significant other, attended all classes, and weighed themselves frequently were more successful at weight loss.
The questionable success rates of traditional weight loss programs and the controversy regarding the possible adverse effects of weight loss have led to a growing antidieting movement (Ryan, 1995, St. Jeor, 1993). However, weight maintenance strategies that help women achieve a weight that supports good health are arguably important.

Some efforts have focused on weight management without traditional dieting, placing emphasis on cessation of restrictive food patterns, gradually increasing exercise, and encouraging a low-fat, high carbohydrate food pattern (Foreyt and Goodrick, 1993). The emphasis is on choosing healthy foods rather than being restricted to a list of certain foods.

**Stage of Change Theory**

The current focus of nutrition education research is not only whether the program works, but why it is effective. More attention is being paid to the process of designing and implementing successful nutrition education programs than to program evaluation alone (Smith and Lopez, 1991).

Theory helps to describe relationships by organizing concepts and principles. Research efforts should focus on application of appropriate theory through theoretical models (Smith and Lopez, 1991).

Several models have been developed to explain, predict and modify behavior of individuals as well as populations. The Transtheoretical Model of behavior change, also known as the Stage of Change Model (stage model), provides a theoretical model for accelerating behavior change (Prochaska and
DiClemente, 1986). The stage model defines behavior change as a dynamic variable with five stages consisting of precontemplation, contemplation, preparation, action, and maintenance (Table 1).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>The subject has no intention of changing behavior in the foreseeable future. People in this stage tend to be unaware that they have a problem and are resistant to efforts to modify the behavior.</td>
</tr>
<tr>
<td>Contemplation</td>
<td>Subjects are aware that they have a problem and are seriously thinking about resolving it, but they have not yet made a commitment to take action in the near future.</td>
</tr>
<tr>
<td>Preparation</td>
<td>This is the stage of decision making. The persons have made a commitment to take action within the next 30 days and are already making small behavioral changes.</td>
</tr>
<tr>
<td>Action</td>
<td>Subjects make notably overt efforts to change. They are classified in the action stage if they have modified the target behavior to an acceptable criterion.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Persons are working to stabilize their behavior change and avoid relapse. In general, maintenance is sustaining action for at least 6 months.</td>
</tr>
</tbody>
</table>

People are thought to cycle and repeat stages, exiting at times and reentering (Frankle and Owen, 1993). Movement through the stages is a mark of program effectiveness (Glanz et al., 1994).
The stage of change construct was initially used to study addictive behavior. Research on smoking cessation revealed its applicability for smokers because they could be classified into the various stages (Prochaska et al., 1993). The stages of change constructs have also been validated on several other problem behaviors including weight control (O'Connell and Velicer, 1988), exercise (Marcus et al., 1992), and dietary fat reduction (Curry et al., 1992).

Application of the model to weight control involves classification of subjects into stages by degrees of overweight and/or success with weight loss and maintenance (i.e. precontemplation = minimum of 5 pounds overweight and no thought of or action to lose weight, maintenance = minimum of 10 pounds lost in the past and current action being successfully taken to combat regaining the weight with no goal of further weight loss) (O'Connell and Velicer, 1988).

Curry et al. (1992) assessed the applicability of the stage model to dietary change. It was found that for both genders, stage of dietary fat reduction was significantly associated with percent of calories from fat. In order to classify stage for dietary fat reduction, several algorithms have been developed. The “Avoid” algorithm was validated by Greene et al. (1994). Subjects avoiding high-fat foods who said they had been avoiding these foods for more than 6 months were classified in the maintenance stage. Subjects who had been avoiding high-fat foods for less than six months were placed in the action stage. Those who were not avoiding high-fat foods but intended to start in the next 30
days were considered to be in the preparation stage. Subjects who were not avoiding high-fat foods but planned to start in the next six months were classified in the contemplation stage. Those who were not avoiding high-fat foods and did not intend to start in the next six months were placed in the precontemplation stage (Greene et al., 1994).

In contrast to cigarette smoking, in which one can specify a singular behavioral goal (i.e. abstinence from smoking), dietary fat reduction involves a complex set of behaviors. Since most people are unable to determine whether their diet exceeds 30% of energy from fat (Greene et al., 1993), Greene et al. (1994) validated a Behavioral algorithm consisting of behavioral markers for low-fat intake. The Behavioral algorithm follows the stage classification of the Avoid algorithm. Persons must meet certain behavioral action criteria to be classified in the action or maintenance stage. Subjects defined as being in the action or maintenance stage by the Avoid algorithm who fail to meet the behavioral action criteria are reclassified into the preparation stage (Greene et al., 1994) (Table 2).

Several studies have shown that targeting intervention based on a person’s stage of change leads to accelerated behavior change (Prochaska et al., 1993). Campbell et al. (1994) demonstrated that messages individually tailored to a person's stage of change generated a greater reduction in dietary fat intake than nontailored messages based on dietary intake. Nutrition education and interventions can be enhanced by attention to stage of change.
Table 2. Behavioral algorithm for reducing fat to $\leq 30\%$ of energy. Adapted from Kristal et al., 1990

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you often eat special low-fat cheese? (If you do not eat cheese, answer yes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you often eat bread, rolls, or muffins without butter or margarine?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you usually take the skin off your chicken? (If you eat red meat but do not eat chicken, answer no; If you do not eat red meat or chicken, answer yes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you often use low-calorie or no-fat salad dressing? (If you do not eat salads, answer no)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you sometimes eat fruit or vegetables as snacks? (If you do not eat high-fat snacks like chips, pastry, or donuts, answer yes)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worksite Nutrition Education Programs

Worksites offer an attractive setting for nutrition intervention activities because employees are in one location on a regular basis. Worksite health promotion has grown considerably in the past decade (Contento et al., 1995, Glanz and Seewald-Klein, 1986). The percentage of worksites that offer nutrition education almost doubled between 1985 and 1992, increasing from 48% to 78% for large worksites (those with more than 750 employees) and from 9% to 22% for small worksites (those with 50-100 employees). Worksites offering weight control programs increased from 15% to 24% in the same period (USDHHS, 1992).
Most of the programs use direct or interpersonal approaches (Contento et al., 1995). There has been an increase in the use of self-instructional or minimal contact methods. This approach was evaluated by Peterson et al. (1985). They found that self-instructional materials resulted in weight loss similar to that seen in group sessions led by professionals.

Worksite health programs compete with a wide variety of activities for employee's attention, and health programs may not be a top priority for employees (Mullis and Lansing, 1986). Therefore it is important to determine what factors enhance worker participation in the programs before designing and implementing the program. The focus group discussion provides the opportunity to learn about these factors and gather informal information (Mullis and Lansing, 1986).

The Pennsylvania State University Nutrition Education Center (Shannon et al., 1986) developed a video weight-control program for the Atlantic Richfield Company employees. Topics included the relationship of nutrition to general health and well-being, use of food exchanges, calorie sources, energy balance, ways to increase physical activity, strategies to handle problem eating habits, sources of hidden calories, ways to prepare food to reduce calories, special occasions and eating out, and a review of strategies for maintenance. The program was pilot tested and evaluated for effect on nutrition knowledge, attitude, and frequency of food intake. The evaluation results were not cited for reasons unknown.
Nutrition Education Via the Internet

Nutrition educators have demonstrated that enhanced communication efforts can improve health and well-being. The use of communication technology is emerging as a means of exchanging nutrition information (Kolasa and Miller, 1996). New technology provides many opportunities for nutrition educators (Monsen, 1995). The use of on-line applications such as electronic mail (e-mail), discussion groups, and listservs (electronic mailing lists) is rapidly increasing due to the exponential growth of the Internet and the World Wide Web (WWW). Use of these technologies in the nutrition community is just now emerging (Kolasa and Miller, 1996).

Use of Electronic Mail

Although the use of computer technology has been heralded for facilitating communication between individuals in different geographic areas, the use of e-mail as a delivery method for informal nutrition education has been limited.

E-mail uses computer text-processing and communication tools to provide a high-speed information exchange (D'Souza, 1992). E-mail enables an individual to send a message or transfer a file or document to an individual, group of individuals, or an organization (Facinoli, 1996). E-mail has many characteristics useful for communication:
1. Speed: Messages can be transmitted in seconds to any place in the world.

2. Asynchronous communication: Messages can be read, sent and replied to at the convenience of the consumer.

3. No intermediaries: E-mail messages are generally only read by the receiver.

4. Ephemerality: E-mail messages appear on screen and can easily be deleted with no trace of a hard copy.

E-mail is regarded as a multi-purpose communication tool. Researchers have established the utility of e-mail in conducting survey research (Thach, 1995). Vergoth (1995) reports that collaborating by e-mail leads to very effective decision making and allows participants to work with information when they are at their best.

The expanding role of electronic mail as an effective teaching supplement has been established (Lowry et al., 1994, Poling, 1994, D'Souza, 1992). E-mail has been used in schools as a vehicle for discussion groups. Participants have reported enjoying and valuing the electronic discussion group although more research is needed on how electronic discussion affects learning (Lowry et al., 1994).

There are many aspects of e-mail that impact learning. For example, learners can participate when it is convenient. Also, e-mail provides automatic notes; it can be excellent for people who have difficulty or hesitation expressing
themselves in a more public setting. However, lack of face-to-face contact may impede the social aspect of learning (Lowry et al., 1994).

Electronic mail applications to distance learning are increasing as the number of non-traditional and off-campus students interested in post-secondary education is on the rise (Carl, 1991). The power of e-mail is that it brings people together.

Some nutrition professionals believe that lack of responsibility for information accuracy is a drawback to the freedom of information exchange. To the contrary, others feel that it has never been possible to control nutrition misinformation and effort should focus on communicating valid nutrition information via electronic media, as well as other channels (Kolasa and Miller, 1996).

Two additional areas of concern raised by nutrition educators are access to e-mail and effectiveness (Kolasa and Miller, 1996). The number of Americans using the Internet WWW network is growing (Brightman, 1995). Almost 28 million Americans can use the Internet for e-mail, but finding out who has access is difficult because the Internet is a decentralized network (Brightman, 1995). It is certain however that the number is large and growing. The challenge for nutrition educators with access is to develop and evaluate education programs and participate in forums and other electronic exchanges (Kolasa and Miller, 1996). In terms of effectiveness, it is critical that the design and selection of technology is in keeping with the purpose of the program (Kolasa and Miller,
1996). As computer networks continue to grow, e-mail can provide a conduit for new ideas, uses, and applications for the educational community.

**E-mail and Women**

It has been argued that gender and age differences predict usage of computer networks. In a sample of university faculty from two fields, Parry and Wharton (1995) found that younger faculty use the networks more, take advantage of a fuller variety of options, and express greater feelings of expertise. Males, however, did not use the network more than females. In a survey of on-line service users conducted by Interactive Publishing Alert, supported by Apple Computer, 237 female respondents reported swapping e-mail with family and friends as the feature they use the most (Resnick, 1995).

As more Americans gain access, the use of electronic mail as a means to educate has vast potential. Employed women with access to electronic mail provide an opportunity to assess the effectiveness of the technology for delivery of informal messages concerning maintenance of a healthy weight.
METHODS

Preliminary Research/Needs Assessment

A review of the literature showed that women's health issues are a public health priority. Use of electronic mail (e-mail) for informal education of women has been limited.

Extension food and nutrition specialists from across the country were surveyed in June of 1995 to determine their use of e-mail for nutrition education programming. The responses indicated that e-mail has been utilized for credit courses and distance education but not for the purposes described in this thesis.

Subjects

The Oregon State University (OSU) Office and Personnel Association (OPA) was approached about pilot testing the program because members are campus wide, computer oriented, and have access to e-mail. OPA is an association of approximately 250 office personnel. The majority of members is female. Member attendance at brown bag seminars on nutrition topics had revealed member interest in the area of diet and nutrition.

The study proposal was presented to the OPA Board of Directors in July of 1995. Approval was granted to conduct the program with their membership.
Roundtable Discussion

Information about topics of interest to OPA members was gathered in August 1995 when a 45-minute roundtable discussion was conducted. The participants were recruited by the President of OPA. The discussion was patterned after a focus group format, with predetermined open-ended questions, which allowed for ideas and attitudes to be expressed. Five female OPA members identified the nutrition education needs of employed women in this group (See Appendix A for questions and selected responses).

Several themes emerged: 1) Concern about increasingly sedentary work roles, 2) Lifestyle changes necessary for weight loss and maintenance, 3) Confusion about conflicting nutrition information (misinformation), 4) Learning how to use the new food label to plan healthy diets, 5) “Light” and “low-fat” foods, 6) Enjoyment in sharing health and nutrition information with co-workers.

In addition, information was gathered about e-mail usage and format preferences for educational materials. Participants indicated that messages should be short, attention grabbing, and should cover a variety of topics, possibly under one theme. Members were more comfortable using e-mail than the World Wide Web.

Focus group members felt that after the winter holidays would be a good time to deliver messages regarding weight control. A final decision was made to develop materials covering a variety of topics, emphasizing moderation of fat intake, under the theme of weight management.
Program Development

Responses from the roundtable discussion along with current literature about weight management were used to develop a program about healthy eating and exercising. It was decided that a series of eight messages would be an appropriate length.

Two versions of the program were developed, both containing the same information. One was a "print version" and the other, an "electronic version". In addition, four brief electronic messages (Bytes) consisting of relevant tips and opportunities for participants to share ideas were developed to supplement the printed version of the program.

Message Development

The "On-Line to Healthy Weighs" messages were developed using OSU Extension resources along with current literature and educational references.

Table 3. “On-Line to Healthy Weighs” message topics

<table>
<thead>
<tr>
<th>Message Number</th>
<th>Message Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Defining Healthy Weight</td>
</tr>
<tr>
<td>2</td>
<td>The Whys of Exercise</td>
</tr>
<tr>
<td>3</td>
<td>FAT: Achieving Moderation</td>
</tr>
<tr>
<td>4</td>
<td>Clues on the New Food Label</td>
</tr>
<tr>
<td>5</td>
<td>The “Low-fat” Calorie Trap</td>
</tr>
<tr>
<td>6</td>
<td>Fat Substitutes</td>
</tr>
<tr>
<td>7</td>
<td>Fast Food Lightens Up</td>
</tr>
<tr>
<td>8</td>
<td>Snack Attacks</td>
</tr>
</tbody>
</table>
The print/hard copy version consisted of four two-sided handouts (See Appendix B for finalized print version of Healthy Weighs messages). Each handout had one message on the front of an 8.5” x 11” sheet of colored paper and one on the back. It was decided to print the handouts on canary yellow, pastel blue, pastel green and soft pink paper, respectively. The header was designed using Word-Perfect 6.1 and the logo was obtained from Corel Draw. Clip art from OSU Extension files was used for aesthetic purposes. Each message was concluded with a “Did you know” box containing a relevant fact.

The electronic version of the program consisted of eight e-mail messages. The electronic messages had the same text as the print/hard copy version. Since graphics are not a function of e-mail, keyboard dashes and slashes were used to design a header. Creative use of stars allowed for division of sections and delineation of lists (See Appendix C for finalized electronic version of Healthy Weighs messages).

Message Content

The “On-Line to Healthy Weighs” messages did not target any one specific stage of change. Appropriate information for all of the stages was provided at varying lengths and depths.

#1 Defining a Healthy Weight: Maintenance of a healthy weight is important for health and disease prevention. This message began by stating the disease risk associated with excess weight. Since recommended weight is controversial, reports from two contradictory studies were paraphrased.
Recommended weights for women were taken from the 1959 Metropolitan Life Insurance Tables. The concept of “graded disease risk” was explained.

**#2 The Whys of Exercise**: Physical activity is associated with successful weight management. This message was developed to encourage more physical activity throughout the day. Examples of moderate physical activity were provided. Emphasis was placed on finding enjoyable physical activities and making them part of a healthy lifestyle. The recent popularity of brisk walking was discussed along with ways to do more walking throughout the day.

**#3 Fat: Achieving Moderation**: Lowering fat in the diet is recommended by health authorities. This message compared current fat intake in the United States to recommended fat intake. The message aimed to clear the misconception that “limiting fat means eliminating favorite foods”. Examples were provided on how to “moderate” fat in the diet. Increasing consumption of complex carbohydrates was suggested to lower fat intake.

**#4 Clues on the New Food Label**: Using information on food labels can be helpful in planning a healthy diet. This message explained label information related to maintaining a healthy weight. The “Percent daily value” concept on the label was explained in the context of fat allowance per day. Looking for “nutrient dense” foods was advised and an example was provided on how to choose a more nutrient dense snack.

**#5 The Low-fat Calorie Trap**: Nutrition experts are concerned that the prevalence of overweight is related to overconsumption of low-fat foods. This message was developed to emphasize that calories from low-fat foods can lead
to weight gain if overconsumed. Definitions of terms on labels related to fat in foods were provided. Calorie and fat gram comparisons of regular and reduced fat foods were listed.

**#6 Fat Substitutes:** As Americans strive to lower fat in the diet, food companies are developing fat replacements. This message explained the difference between calorie-reduced and calorie-free fat substitutes. The fat replacer Olestra, recently approved by the FDA, was discussed in more detail as it will soon appear in salted snacks and crackers. Wise consumption of fat substitutes to lower fat and achieve a healthy weight was discussed.

**#7 Fast Food Lightens Up:** The demand for light foods is growing. They are important for lowering fat in the diet and improving weight. This message was developed to discuss lighter entrees, beverages and desserts offered by several major fast food establishments. Examples of healthier food choices at each restaurant were provided (with calorie and fat gram information). Included was a warning that some "light" items are still high in calories and fat. Tips on ordering "light" food items were provided.

**#8 Snack Attacks:** Snacking has been associated with increased calorie intake. This message emphasized making wise snack food choices. It advised selecting more wholesome foods. A list of snacks with about 100 calories was provided. The message discussed preventing overindulgence by eating a small amount of favorite snacks or by eating "semi-favorite" foods. Browsing the grocery store for new low-fat versions of favorite snacks was suggested.
Byte Development and Content

Four electronic “Byte” messages were developed to supplement the print version of the program. Bytes were developed considering current and relevant topics/news on weight management. They were delivered by e-mail using the same header as the electronic messages. Each included a “Question of the Week” that related to the topic(s) covered in the corresponding weekly hand-out and invited participants to communicate with the researcher. The Bytes were not finalized until the actual delivery of the program. This allowed flexibility to modify the content based on issues arising during the actual program delivery (See Appendix D for finalized Byte messages).

Byte #1: Concern about the weight ranges in message #1 was voiced by several subjects. This prompted a modification of the first Byte to further explain how to interpret the weight ranges. A current article in US News and World Report about overweight in America was discussed. The “Question of the Week” was: Have any of you found ways to work exercise into your busy schedule?

Byte #2: Responses to the Byte #1 “Question of the Week” were summarized. The “Question of the Week” was: Have any of you found ways to lower your fat intake? Cook with less fat? Low fat foods of interest?

Byte #3: Responses to the Byte #2 “Question of the week” were summarized. A question regarding how to calculate percent calories from fat was explained. A new fat replacer on the market was discussed. The message reinforced the concept of calorie control with low fat food products. The
“Question of the Week” was: Have you tried the new fat replacer? Have you found other fat replacers that work for you?

Byte #4: This Byte discussed two relevant topics: 1) That there are no miracle solutions for maintaining a healthy weight (avoid diet scams) and 2) Social support is important when trying to make lifestyle changes. The participants were reminded that this Byte concluded the series and were encouraged to provide feedback in the evaluation questionnaire.

Program Dissemination

Healthy Weighs messages were sent to all members of OPA. By not recruiting subjects, the materials reached many women (and men) who may not have “signed-up” to participate. In addition, recruitment may have selected out those women in higher order stages of change and the study design depended on a mix of all stages.

The subjects were randomly assigned to three experimental groups using a random numbers table and a random start (Dixon and Massey, 1957). Group #1 received the print version of the program delivered by campus mail once per week over a four week period. Group #2 received the print version of the program delivered by campus mail once per week over the four weeks along with a weekly Byte sent by e-mail. Group #3 received the electronic version of the program sent by e-mail twice per week over the four week period.

Listservs were set up for groups #2 and #3. This allowed for group members to receive an electronic message by sending it to one address
(majordomo). To minimize the possibility of transmission problems, the electronic messages were sent from the staff account of a former OSU Extension employee rather than from the student account of the researcher.

**Instrument Development**

To measure the effectiveness of the program and to evaluate the use of e-mail as a delivery method for nutrition education, an evaluation questionnaire was developed. The questionnaire was formulated using validated questions from the literature and questions developed by the researcher and committee members. The evaluation questionnaire was approved by the Human Subjects Committee at Oregon State University (See Appendix E for evaluation survey).

The evaluation questionnaire assessed: 1) Participants' stage of change for reducing fat, 2) Participants' social support network for weight management, 3) Reactions to the program, 4) Impact of the program on weight control behavior, and 5) Demographics.

**Stage of Change Questions**

To determine the participants' stage of change for reducing dietary fat, two questions were asked. Responses to one question, along with a follow-up question were used to place the participant into one of five stages of change (maintenance, action, preparation, contemplation, precontemplation). Answers to these questions were used to address both research hypotheses.
Table 4. Evaluation survey questions for determining Healthy Weighs participants' stage of change.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6 Do you consistently avoid eating high-fat foods? (Greene et al., 1994)</td>
<td>____ More than six months</td>
</tr>
<tr>
<td></td>
<td>____ Less than six months</td>
</tr>
<tr>
<td>Q6A If yes, how long have you been avoiding them? (Greene et al., 1994)</td>
<td></td>
</tr>
<tr>
<td>Q6B If no, please check one of these statements: (Greene et al., 1994)</td>
<td>____ I plan to start avoiding them in the next 30 days</td>
</tr>
<tr>
<td></td>
<td>____ I plan to start avoiding them in the next six months</td>
</tr>
<tr>
<td></td>
<td>____ I will NOT start avoiding them in the next 6 months</td>
</tr>
</tbody>
</table>

A series of 5 questions adapted from Greene et al. (1994) were used to establish a baseline regarding behavioral markers for "low-fat" intake.

Table 5. Evaluation survey questions on behavioral markers for low-fat intake. Adapted from Greene et al., 1994.

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 Do you often eat low fat cheeses?</td>
</tr>
<tr>
<td>Q2 Do you eat red meat?</td>
</tr>
<tr>
<td>Q3 Do you eat chicken?</td>
</tr>
<tr>
<td>Q3A If yes, do you usually take the skin off?</td>
</tr>
<tr>
<td>Q4 Do you often use low-calorie or no-fat salad dressing?</td>
</tr>
<tr>
<td>Q5 Do you sometimes eat fruit or vegetables as snacks?</td>
</tr>
</tbody>
</table>
Social Support Questions

A series of three questions was designed to determine social support with regard to weight control. One question determined whether participants were trying to change their weight recently (Q7 - Have you tried to change your weight in the last year?). Two follow-up questions measured supportiveness of co-workers and family (Q7A-How supportive were co-workers?, Q7B-How supportive was your family?).

Program Reaction Questions

Nine questions were designed to assess the participants' reactions to the messages. One question was included to determine if all messages were received (Q8 - Did you receive all eight of the Healthy Weighs messages?). One question was designed to determine whether participants read and/or kept the messages. Each message title was listed in a table format. Response categories for each message included: Read, Kept, Neither, and Not Sure (Q9 - For each of the messages, please indicate whether you READ and/or KEPT them. Indicate NEITHER when appropriate.).

One question was included to determine which topics were most informative (Q11 - Which of the topics listed in Question 9 were most informative? {Please list topic numbers}). Blanks were provided to indicate number(s) of most informative message(s).
Four questions were designed to assess format preferences and reactions to the program using a 5-point Likert agree/disagree scale (Q16A - I looked forward to reading the Healthy Weighs messages, Q16B - I'd rather read e-mail messages about healthy eating than printed fact sheets, Q16C - The messages were about the right length, Q16D - I would have liked to chat on-line with others about the messages).

One question was designed to determine preferred delivery method. The three methods were explained and participants were asked to select a preferred delivery format (Q17 - We used three methods of sending Healthy Weighs messages to you. One group received printed copies through campus mail. A second group received the same messages by electronic mail. The last group received the printed messages along with a weekly electronic mail tip ("Byte") that was an opportunity for sharing ideas. Please rank your format preference (1 = first choice, 2 = second choice, 3 = third choice). __Printed format, __Electronic format, __Printed format with electronic mail tip ("Byte").

An open-ended question was included to get additional feedback about the program and how it might be improved in the future (Q21 - Do you have suggestions for improving the "On-Line to Healthy Weighs" program?)

Program Impact Questions

Thirteen questions were developed to assess the impact of the program. One was designed to determine degree of learning (Q10 - Which best describes your reactions to the "On-Line to healthy Weighs" messages? The messages
increased my knowledge a little bit. The messages increased my knowledge a lot. The messages reinforced what I already knew.

One question was included to determine if the subjects used information in the first message (Q13 - Did you use the height/weight chart in message #1 to evaluate your weight status?).

Another was designed to determine if the information was shared with others (Q12 - Did you share information from the messages with anyone else?). A follow-up question determined with whom the messages were shared (Q12A - If yes, with whom? Coworkers, Family, Friends).

Six questions were designed to assess whether participants were doing anything differently as a result of receiving the messages. If participants were already doing the stated activity, they were directed to answer "no" (Q14A - I'm finding more ways to increase my physical activity throughout the day, Q14B - I'm trying to watch my fat intake, Q14C - I'm reading labels to check the fat/calorie content of foods, Q14D - I'm trying to choose leaner food when I eat at fast food restaurants, Q14E - I'm trying to eat low-fat snacks, Q14F - I'm paying more attention to news about fat substitutes).

To determine whether the Healthy Weighs messages had an impact on consumption of foods important for reduction of fat in the diet, five questions were included about an increase, decrease or no change in consumption of various foods (Q15A - Low fat cheeses, Q15B - Low calorie/ Low fat salad dressing, Q15C - Fruits and Vegetables, Q15D - Chips, pastry, donuts, Q15E - Bread, rolls, or muffins without butter or margarine).
Demographic Questions

Questions were included to determine participants’ age and gender. A final question was designed to determine whether participants were involved in fitness programs and if so, which type (Q20 - Are you currently participating in fitness programs?, Q20A - If yes, please check all that apply: OSU faculty/staff facilities or fitness programs, Community gyms/Clubs, Other).

Pilot Test of the Program and Evaluation Survey

The electronic version of the program was pilot tested with four off-campus OSU Extension clerical staff. There were some glitches in transmitting messages due to the interface of on-campus and off-campus networks. However, responses to the Healthy Weighs program were favorable.

All four participants completed the evaluation questionnaire. Their suggestions related to message content were considered in finalizing the program.

As a result of the pilot test, one evaluation question was modified and one question was added. Among the program impact questions, Q12A was changed to provide response categories for friends, family and co-workers rather than leaving the question open-ended. To gain a better understanding of participants’ reactions to the program, Q17 regarding preferred method of delivery was added.
Study Approval

The study was submitted for approval by the OSU Institutional Review Board for the Protection of Human Subjects in November 1995. The project was approved with one stipulation: modification of the informed consent letter to allow OPA members to be deleted from the mailing list if they did not wish to participate.

Because participants were to receive the messages during their workday, Human Resources approval was sought. An explanation of the program was sent to Jacquelyn Rudolph, the Director of Human Resources. She agreed that “participation in the program is university sponsored and, therefore, work time may be used to read messages and respond to the evaluation questionnaire.” This statement was incorporated into the informed consent letters.

Informed Consent

Informed consent letters were developed for each of the three groups (See Appendix F for informed consent letters). The letters introduced the researchers, explained the program, mentioned the evaluation questionnaire, included the approval statement by Human Resources and explained the procedure for being removed from the mailing list. They were delivered along with the first message.
Implementation of the Program

The print messages were delivered in 6" x 9" white envelopes with mailing labels. Each envelope was stamped with the "On-Line to Healthy Weighs" logo. The electronic messages were delivered via the majordomo.


<table>
<thead>
<tr>
<th>Date</th>
<th>Print</th>
<th>Print/Byte</th>
<th>Electronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/23</td>
<td>Message #1</td>
<td>Message #1</td>
<td>Message #1</td>
</tr>
<tr>
<td></td>
<td>Message #2</td>
<td>Message #2</td>
<td>Message #2</td>
</tr>
<tr>
<td>1/25</td>
<td>-----------</td>
<td>Byte #1</td>
<td>Message #2</td>
</tr>
<tr>
<td>1/30</td>
<td>Message #3</td>
<td>Message #3</td>
<td>Message #3</td>
</tr>
<tr>
<td></td>
<td>Message #4</td>
<td>Message #4</td>
<td>Message #4</td>
</tr>
<tr>
<td>2/1</td>
<td>-----------</td>
<td>Byte #2</td>
<td>Message #4</td>
</tr>
<tr>
<td>2/6</td>
<td>Message #5</td>
<td>Message #5</td>
<td>Message #5</td>
</tr>
<tr>
<td></td>
<td>Message #6</td>
<td>Message #6</td>
<td>Message #6</td>
</tr>
<tr>
<td>2/8</td>
<td>-----------</td>
<td>Byte #3</td>
<td>Message #6</td>
</tr>
<tr>
<td>2/13</td>
<td>Message #7</td>
<td>Message #7</td>
<td>Message #7</td>
</tr>
<tr>
<td></td>
<td>Message #8</td>
<td>Message #8</td>
<td>Message #8</td>
</tr>
<tr>
<td>2/15</td>
<td>-----------</td>
<td>Byte #4</td>
<td>Message #8</td>
</tr>
</tbody>
</table>

Messages sent to invalid or incorrect addresses were returned to the sender address as "undeliverable". These addresses were corrected for typographical errors or deleted if nonexistent. In accordance with the Human Subjects Committee stipulation, those who did not want to participate were deleted from the mailing list.
Evaluation

Two rounds of the evaluation questionnaire were delivered in print form by campus mail. The first round was delivered on Friday, March 1st. Participants who had not returned the evaluation by Friday, March 8th, were sent another copy. As an incentive, “Java Buck” coupons, good for one dollar, were purchased from the coffee shop located in the OSU Memorial Union. “Java Bucks” were sent to participants upon receipt of completed questionnaires.

A cover letter accompanied the evaluation questionnaire. Instructions for completion and return were provided. Participants were encouraged to provide feedback and were informed of the “Java Buck” incentive. Because the prior employee’s name had appeared in the e-mail masthead, a note was added to clear any confusion about the sender address for those receiving the electronic messages (See Appendix G for evaluation cover letter).

Statistical Analysis

The data were analyzed with the assistance of a statistical consultant using the SAS Statistical Programming Package. A level of significance was set at $p \leq .05$. 

RESULTS AND DISCUSSION

Subjects

The "On-Line to Healthy Weighs" materials were sent to 242 members of OPA. Two men wrote messages requesting removal from the list and one male responded by e-mail that he would be passing the information on to his wife. Three women heard about the "Healthy Weighs" program and requested participation in the program. A total of 243 participated in the program: Print group = 84, Print/Byte group = 79, Electronic group = 80. The gender of participants could not be easily determined from names. It was known that about 95% of the OPA membership was female.

Evaluation Response

The evaluation questionnaire was completed by 195 out of 243 (80.2%) participants: 66 in the print group (78.5%), 61 in the print and Byte group (77.2%), and 68 in the electronic group (85.0%). Three questionnaires were unusable. The total adjusted response rate was 79.0% (192/243).

Nine respondents were men (4.6%) and 183 were female (95.3%). The mean age of respondents was 47.8 ± 13.3. The ages ranged from 23 to 64 years. The nine men and the two gender-unidentified respondents were not included in the data analysis to assure homogeneity and a total female population. A total of 181 evaluation questionnaires were analyzed (74.5%).
Diet and Exercise Habits

A summary of the diet and exercise habits of the women is provided in Table 7. The majority of women ate meat: 88% reported eating red meat (Q2) and 96% reported eating chicken (Q3). Of those eating chicken, 85% reported taking the skin off (Q3A). The majority (79%) were using low-fat/low-cal salad dressings (Q4), whereas less than half (46%) were eating low-fat cheeses (Q1). Nearly all (94%) women reported eating fruits and vegetables as snacks (Q5).

Over half (60%) of the women were not participating in a fitness program (Q20). This finding is consistent with data from a national survey (1991) showing that 58.5% of adult women reported a sedentary lifestyle (CDC, 1993). Of the 40% who were participating in a fitness program, the majority (68%) were involved in programs other than OSU-sponsored or community based (Q20A). In the evaluation questionnaire, the option for “home program” was not provided, although several respondents wrote in “home program” in the “other” category.

Seventy-two percent of the women reported trying to change their weight in the last year (Q7). National estimates of the number of women trying to lose weight is around 40% (Serdula et al., 1993). In this study, of those trying to lose weight, about half (48%) reported “very” supportive families and 41% reported “somewhat” supportive families (Q7A). A total of 35% reported “very” supportive (14%) and “somewhat” (21%) supportive coworkers, whereas the majority (62%) reported that “support wasn’t sought” from co-workers (Q7B). Contrary to
these findings, Hertzler et al (1983) found that co-workers were identified about as often as the family for support activities.

Table 7. Diet and exercise habits of women who participated in the Healthy Weighs program.

<table>
<thead>
<tr>
<th>Question</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 Often eat low fat cheeses</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>46%</td>
</tr>
<tr>
<td>No</td>
<td>49</td>
</tr>
<tr>
<td>I don't eat cheese</td>
<td>6</td>
</tr>
<tr>
<td>Q2 Eat red meat</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>89</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
</tr>
<tr>
<td>Q3 Eat chicken</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>96</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>Q3A If yes, take skin off</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>85</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
</tr>
<tr>
<td>Q4 Often use low-cal/no fat salad dressing</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>79</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
</tr>
<tr>
<td>I don't eat salad</td>
<td>3</td>
</tr>
<tr>
<td>Q5 Sometimes eat fruit or Veg.'s as snacks</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>94</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
</tr>
<tr>
<td>Q20 Currently participating in a fitness program</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
</tr>
<tr>
<td>No</td>
<td>60</td>
</tr>
<tr>
<td>Q20A If yes, which kind</td>
<td></td>
</tr>
<tr>
<td>OSU faculty/staff</td>
<td>33</td>
</tr>
<tr>
<td>Community gyms/clubs</td>
<td>21</td>
</tr>
<tr>
<td>Other</td>
<td>68</td>
</tr>
<tr>
<td>Q7 Have you tried to change your weight in the last year?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>72</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
</tr>
</tbody>
</table>
Program Reactions

Most women (78%) responded that they had received all eight Healthy Weighs messages (Q8), whereas 17% reported “not sure”. Incorrect addressing, faulty mail services, and unsuccessful electronic transmission may have contributed to delivery problems. There was strong evidence that their perception of message receipt (Q8) was associated with the mode of delivery (Chi-square test for independence, p<.001). Ninety-four percent of those in the electronic group were sure that they received all eight messages, compared to 75% in the byte group and only 60% in the print group. Perhaps the electronic messages had less tendency to get lost amongst other incoming mail.

Almost two-thirds of the women (65%) reported reading all “eight” of the messages (Q9), whereas only 8% read “zero” messages. Forty-four percent reported keeping “zero” of the messages and 38% kept all “eight” (Q9). Each message was read by between 44% and 50% of the women (depending on the message). Each message was both read and kept by between 32% and 36% (depending on the message) (Q9). Between 5% and 9% of the women were not sure if they read or kept the messages, and 0% to 2% neither read nor kept each of the messages (Q9). Among modes of delivery, there was no significant difference in the number of messages read (ANOVA).

How the women interpreted the term “kept” was unknown. For those in the electronic group, the term “kept” may have meant not deleting the message or it may have meant actually printing the message and saving for later use. In addition, few women distinguished among the messages, but rather indicated
that they had read and/or kept all or none. Perhaps they weren’t able to specifically recall what was in each message.

Reactions to receiving the Healthy Weighs messages were favorable. Seventy seven percent either “strongly agreed” (37%) or “agreed” (40%) that they looked forward to reading the messages (Q16A). Only 2% “disagreed” and “strongly disagreed” with the statement. The mean score on the Likert scale (strongly agree = 1; neutral = 3; strongly disagree = 5) was 1.9 ±.9. Among the modes of delivery, there was no significant difference in looking forward to reading the messages (ANOVA).

There was less agreement as to whether the women would rather read an e-mail message than a printed fact sheet (Q16B): 39% “strongly agreed” or “agreed”, 29% were “neutral”, and 32% “disagreed” or “strongly disagreed”. The mean score on the Likert scale was 2.9 ±1.3. Whether women would rather read e-mail messages about healthy eating than printed fact sheets was related to the mode of delivery (ANOVA, p≤.001). Participants in the print/Byte and electronic groups were more likely to prefer e-mail than those in the print group. Perhaps familiarity with the electronic mode of message delivery influenced preference.

The majority (89%) of women “strongly agreed” (35%) or “agreed” (54%) that the messages were about the right length (Q16C). The mean score on the Likert scale was 1.8 ±0.7. The researchers neglected to ask whether the number or frequency of the messages was appropriate. Among the modes of delivery there was no significant difference in perceiving the messages as
about the right length (ANOVA). The multiple screens of text with electronic
delivery did not seem to influence the women’s perception of appropriate
length.

It appeared that the women would not have been interested in an
opportunity to chat on-line with others about the messages: only 16% would
have liked to chat on-line (Q16D). Forty-four percent were neutral regarding
chatting on-line about the messages, and a total of 42% “disagreed” or “strongly
disagreed” with wanting to chat on-line about the messages (Q16D). The mean
score on the Likert scale was 3.3 ±1.0. The response to this question may have
been influenced by work environment; Time constraints and job demands may
not permit on-line chatting.

If the women had been given the option to select a delivery format, 45%
would have chosen electronic, 25% would have chosen print/Byte and 30%
would have chosen print (Q17). Although Q17 was designed to yield a rank
order of format preferences, more than half of the respondents provided only
their first choice; therefore, only the first choice was used for further analysis.

There was evidence to support a significant relationship between the
actual mode of delivery and preferred mode of delivery (Q17) (Chi square test
for independence, p<.001). The greatest disparity was seen between the print
and electronic groups. The women who preferred the print format were mostly
from the print group, while those who preferred electronic delivery were mostly
from the electronic group. Again, familiarity with the delivery mode seemed to
influence preference.
Reactions to Message Contents

There was a wide range of suggestions for improving the Healthy Weighs program (Q21). The comments are provided in Appendix H.

The first message titled “Defining Healthy Weight” was not well received by a few women who felt the weight recommendations were too low. Perhaps the message should have included weight ranges from several recommendations and further explanation about how to interpret the weight charts. The issue was addressed in the Byte #1 although only one-third of the women received this message with the follow-up information.

Two women in the electronic group responded to the Healthy Weighs messages. One criticized the level of information (too basic) and the other questioned the validity of the recommendation for fat intake.

Anonymity has been reported in the literature as an advantage of e-mail (Lowry, 1994). Several weeks after the program had ended, one woman in the electronic group posed a more personal question via e-mail regarding her weight loss efforts. Another participant e-mailed a specific question about reading food labels. Upon receipt of the last message, five women responded that they enjoyed the program and wished it would continue.

Responses to Bytes

The “Question of the Week” in Byte #1 (Have any of you found ways to work exercise into your busy schedules?) got the most response from
participants. Seven Byte group members responded. Five women responded to Byte #2 (Have any of you found ways to lower your fat intake?). No one responded to Byte #3 (Have you tried the new fat replacer “Lighter Bake” ?) which was delivered to participants during a week of flooding (which may have hindered participation). The responses varied in length and scope. Two women asked for additional information in their Byte responses.

**Program Impact**

The weight assessment chart in the first message was used by almost three-quarters (72%) of the women (Q13). Another 10% reported that they had “not yet” used the chart. This indicated that most of the women were interested in assessing their weight status using information in the message.

Forty-one percent of the women indicated that the messages increased their knowledge a little bit (Q10); 42% reported that the messages reinforced what they already knew (Q10); 12% reported that the messages increased their knowledge a lot (Q10). In addition, there was no evidence that women's knowledge change differed by mode of delivery (Chi-square test).

Increasing knowledge “a lot” may have required a pretest for stage of change and a message series tailored to each stage. In a randomized trial, Campbell et al. (1994) found that messages tailored to participants stage of change were more effective in promoting dietary change. In addition, message length did not allow for in depth coverage that participants in higher order stages of change may have preferred. The Healthy Weighs messages
contained information for all stages and were successful in teaching some new things along with reinforcing what was already known.

Although Q11 was designed to determine which messages were most informative, nearly half of the women did not respond. It is hypothesized that they simply could not recall each one, especially if the messages were not kept. Some noted "can't remember" in the margin. Perhaps it was too difficult to distinguish among the messages.

**Diet and Exercise Change**

Many reported making positive diet and exercise changes as a result of receiving the messages: 40% were “finding more ways to increase physical activity throughout the day” (Q14A), 42% were already doing so and 18% were “not yet”; 46% were “trying to watch fat intake” (Q14B), 48% were already doing so and 7% were “not yet”; 45% were “reading food labels to check the fat/calorie content of foods” (Q14C), 50% were already doing so and 5% were “not yet”; 35% were “choosing leaner foods when eating out” (Q14D), 54% were already doing so and 11% were “not yet”; 44% were “trying to eat low-fat snacks” (Q14E), 53% were already doing so and 3% were “not yet”; 47% were “paying more attention to news about fat substitutes” (Q14F), 43% were already doing so and 10% were “not yet”. The mean number of positive behavior changes was $2.5 \pm 2.2$. There was no evidence of a significant relationship between the mode of delivery and the number of positive changes (ANOVA).
It appeared that the messages had the greatest impact on watching fat intake and paying more attention to fat substitutes. The information on fat substitutes was new. Heaton and Levy (1995) found that many dieters are seeking new information with added "form value" beyond general guidelines. More than half of the women were already choosing leaner foods when eating out, and thus the messages appeared to have the least impact in this area. Influencing exercise behavior appeared to be the most challenging as almost a fifth of the women were not trying to become more active. Perhaps materials for a similar audience should focus more on increasing physical activity. The literature confirms that persons who exercise are more successful at weight loss (Laverty and Loewy, 1993).

As a result of receiving the messages, most of the women reported "no change" in consumption of low-fat cheeses (89%), low fat salad dressing (86%), fruits or vegetables (68%), chips and pastries (58%), and breads without butter or margarine (74%) (Q15A-15E). Thirty-nine percent did report decreasing their consumption of chips and pastries as a result of the program.

Questions 14 and 15 on behavior change did not control for confounding variables. Exposure to other nutrition education materials, news/media, and involvement in other weight control or health classes may have contributed to positive behavior change as well.
Message Sharing

Over half (56%) of the women reported "sharing" the messages with someone else (Q12), although there was no difference among groups regarding whether the women shared the information. Of those who shared the messages, more shared with co-workers (51%) and family (63%) than with friends (25%) (Q12A-12C). The short-term nature of the program may have influenced sharing. Perhaps the women had more contact with co-workers and family than with friends during the four week period. More sharing with family is consistent with the finding that more of the women found family to be supportive of weight loss efforts than co-workers (Q7). The literature affirms the importance of family support. Fowler et al. (1985) found that drop-out rates from weight-reduction programs have been attributed to several factors including limited support from families.

Stage of Change

One hundred and fifty six of the women responded to the question which measured stage of change in regard to fat in the diet: 50% were in the maintenance stage, 10% were in the action stage, 22% were in the preparation stage, 6% were in the contemplation stage, and 12% were in the precontemplation stage (Q6-6B).

Nonresponse may have been due to a format error in the evaluation survey. (An arrow directing the sequence of questions to determine stage of
change was left out of the survey). Also, the stage classification question taken from Greene et al. (1994) may have been confusing. Many made comments in the margin of the survey (Q6). They questioned the meaning of the term “consistently avoid high-fat foods” (e.g. “I do avoid but not always consistently”, “what mean?”, “do you mean never?”, “I try to limit but not avoid”, “cutting back and avoiding are different”, “I eat them with other healthy foods”). Although this question has been used in studies to determine stage of change (Greene et al., 1994), results from this study indicate that the terminology is ambiguous.

According to the stage of change theory, behavior change is a dynamic variable. The women’s stage classification for reducing dietary fat intake did not reflect long term status. People are thought to cycle through the stages, repeat stages, exiting at times and reentering at others (Frankle and Owen, 1993).

Hypotheses

Hypothesis 1: Electronic delivery of messages supplementary to a campus mail program for employed women on maintaining a healthy weight will be significantly associated with higher order stages of change for reducing fat intake.

Hypothesis 2: Electronic delivery of a program for employed women on maintaining a healthy weight will be associated with higher order stages of change for reducing fat intake.

In the study, the group receiving the print version of the program was the control. Supplementing the print version of the program with an electronic “Byte” (print/Byte group) and delivering the program electronically (electronic group)
were tested for greater effectiveness (higher order stage of change) in reducing fat intake.

Since participants were randomly assigned to groups, it was assumed that the proportion of individuals in each stage of change did not differ among groups prior to the program. Therefore, differences among the groups in participant stage of change after participating in the program could be attributed to the type of program received (mode of delivery).

There was no evidence to suggest that the group (mode of delivery) was associated with stage of change (Chi-square test for independence). The results indicate that there was no difference in stage of change for the three delivery methods. The methods were equal in their effect on stage of change. Within each of the three modes of delivery, the total number of participants within each stage of change in descending order was: maintenance, preparation or precontemplation, action, then contemplation (Table 8).

It is not uncommon that few were classified in the contemplation stage. In a study assessing the effectiveness of tailoring messages to stage of change for fat reduction (Campbell et al., 1994), the few participants in the contemplation stage were combined with those in the preparation stage for data analysis.

The large number of women in the maintenance stage is consistent with a general interest in nutrition among OPA members. Their needs may have centered around adherence to a low-fat diet, preventing relapse, and staying moderate with fat intake.
Table 8. Distribution of stage of change for each mode of delivery.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Print</th>
<th>Print/Byte</th>
<th>Electronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>56%</td>
<td>52%</td>
<td>42%</td>
</tr>
<tr>
<td>Action</td>
<td>7</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Preparation</td>
<td>15</td>
<td>19</td>
<td>32</td>
</tr>
<tr>
<td>Contemplation</td>
<td>4</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Precontemplation</td>
<td>18</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

Several variables were associated with stage of change (Q6-6B). The number of positive behavior changes ("yes" responses to Q14A-14F), differed significantly among several of the stages (ANOVA, p<.002). Posthoc tests showed a significant difference between the maintenance and action stage and the maintenance and preparation stage. In the Maintenance stage, 41% made "zero" changes and 9% made "six" changes. In the action and preparation stages, 13% and 24% made "zero" positive changes and 27% and 21% made "six" positive changes, respectively. There was also a significant difference between the action and contemplation stage and the action and preparation stage regarding positive behavior change as a result of the program. Seventy percent of contemplators and 73% of precontemplators made between "zero" and "two" positive changes compared to 20% of those in the action group. Also significant was that 27% of the women in the preparation stage made between "zero" and "two" changes as compared to the contemplators and precontemplators aforementioned.
These results are consistent with the stage of change theory that people vary in their readiness and intentions in relation to attempting positive health behavior change (Prochaska and DiClemente, 1986). By definition, those in the maintenance stage are already working to stabilize their behavior change and avoid relapse and thus the majority reported making “zero” changes as a result of the program. Women in the action and preparation stages made the most changes; This finding coincides with the theory that those in the action and preparation stages are making overt efforts to change or are committed to taking action in the next thirty days, respectively. Precontemplators or contemplators made fewer changes relative to the action and preparation-oriented.

The literature states that those farther along the stages of change are more receptive to learning and using the health related advice (Glanz et al., 1994). Individuals in the precontemplation stage have no intention of changing and those in the contemplation stage are aware of the problem, but are not serious about solving the problem (Prochaska and DiClemente, 1986).

There was no evidence to support an association between stage of change and knowledge change (Q10) (ANOVA). In addition, age was not significantly associated with stage of change (ANOVA).

Limitations

The inferences made in this study are restricted to the women who 1) were members of the Oregon State University Office and Personnel Association during the fall of 1995 and winter 1996, 2) were on the OPA President’s official
mailing list, and 3) returned an evaluation survey by March 18th. The results are not generalizeable to all employed women since a random sampling technique was not employed.

Those who returned an evaluation survey may have been more interested in nutrition and weight control than those who did not.

There was no way to know whether the print and Byte group members actually received the print materials. The electronic messages were returned if undeliverable. Misspelled addresses were corrected and the messages were sent again.

The study design mainly tested for program impact in terms of stage of change. Other impacts of the program (knowledge and behavior change) were difficult to assess. A participant's perception of what was learned from the program was subject to bias and numerous confounding variables as previously discussed.

Women in the same office may have been in different groups. There was no way to control for this interference.

The evaluation survey was administered three weeks after the program and, therefore, the results do not reflect long-term attitudes or behavior changes.

Conclusions/Implications

By sending the messages to everyone on the OPA mailing list, the information reached individuals who may not have signed up for the program.
Therefore, the messages reached more women and women from all stages of change.

It was evident from the study that the majority of women looked forward to reading the messages. Over half shared the messages with the others. Many reported making positive behavior changes as a result of the messages. However, the messages reinforced what most already knew and increased knowledge only a little bit.

The messages had the greatest impact on women in the action and preparation stages. These women looked forward to receiving them more and made more positive behavior changes. At these stages along the continuum of readiness, people are getting ready to change, making small changes, and developing better skills. Perhaps the women in lower order stages of change were not interested in the information and those in the maintenance had already been exposed to the information. Although the results of this study are not generalizable to all employed women, marketing the Healthy Weighs program to women in the action and preparation stages may be the most cost-effective approach. In addition, knowing that the majority of women in OPA are in the maintenance stage may imply that the messages could be tailored to meet the needs of women in this stage.

Electronic delivery of the program or supplementing the print program with the Byte message did not move women farther along the stages of change. The program may not have been conducted long enough to see movement
through the stages. Or perhaps, as our study revealed, the mode of delivery did not affect learning.

The interactive opportunity (Byte) apparently did not affect reaction to or impact of the program. The women in all three groups indicated that support from co-workers was less important than support from family which may explain their lack of interest in the Byte opportunity. In addition, many women were not interested in an opportunity to chat on-line about the messages. The use of e-mail for interactive opportunities was not a priority for the women. Perhaps job demands and work time regulations precluded electronic chatting.

The messages must continually be modified as new and more useful information is published about lowering fat in the diet and maintaining a healthy weight. Modification of the Healthy Weighs messages was necessary up until the delivery. Newer perspectives on defining healthy weight along with recent approval of the new fat replacer required modification of the messages.

Messages on watching fat intake, reading food labels, paying more attention to fat substitutes and eating low-fat snacks were equally effective in improving dietary behavior. They are important aspects of weight maintenance and weight control programming (Fitzgibbon et al., 1995, Burrows et al., 1993). Additionally, future programming on weight maintenance should place more emphasis on the exercise component of successful weight control. Only 40% of the women were participating in a fitness program which is consistent with a national survey (CDC, 1993).
According to the survey, women did not prefer the electronic or Byte format over the print format. Since the mode of delivery appeared to make no difference in whether the women looked forward to the messages, appropriateness of message length, how many of the messages were read or kept, the number of positive behavior changes, or knowledge change, it may not be critical to program effectiveness. If all modes of delivery are viable, perhaps future program delivery should simply consider participant preference.

Electronic delivery was advantageous in a few ways. Participants were more certain that they received all eight messages. Perhaps electronic messages have a more successful delivery rate. The other advantages of electronic delivery were ease of interaction with the educator and anonymity. Several women were more comfortable voicing thoughts, questions and concerns via e-mail. Ultimately, the potential cost savings and convenience of the electronic delivery made it a more attractive option.

**Recommendations for Future Research**

The purpose of developing this nutrition education program was to increase women's knowledge about diet and exercise habits related to weight control and to test the effectiveness of electronic delivery of the program. Future research could also extend to other samples of working women to learn how to better target their needs. A similar study could be done with men or younger women as target populations.
Measuring stage of change for reducing fat intake proved to be a challenge. Validation of a better staging question would be useful.

Future research could focus on the effectiveness of tailoring weight control messages to stages of change.

Incorporating the World Wide Web into the nutrition messages as well as an on-line chat group could be the focus of future research.
SUMMARY

Maintaining a healthy weight has been recognized in the literature as a public health priority. In a roundtable discussion with five women from the OSU Office and Personnel Association, weight control was identified as a topic of interest.

A nutrition education program on maintaining a healthy weight was developed and delivered by both electronic mail and hard copy to members of the organization. The Transtheoretical Model known as stage of change provided a framework for measuring effectiveness.

The program consisted of a series of eight messages titled "On-Line to Healthy Weighs". The message topics included: "Defining a Healthy weight", "The Whys of Exercise", "Fat: Achieving Moderation", "Clues on the New Food Label", "The "Low-fat" Calorie Trap", "Fat Substitutes", "Fast Food Lightens Up", and "Snack Attacks". Two versions of the program were developed (electronic and print/hard copy) both containing the same information. In addition, four brief electronic messages ("Bytes") consisting of relevant "tips" and opportunities for sharing ideas were developed to supplement the print version.

The messages were sent to all 243 members of the OSU Office and Personnel Association, 95% of whom were women. The subjects were randomly assigned to three experimental groups. Group #1 (n=84) received the print/hard copy version delivered once per week by campus mail (two messages/handout) over a four week period. Group #2 (n=79) received the print version delivered once per week along with the weekly Byte sent by e-mail.
Group #3 (n=80) received the electronic version delivered twice per week (one message/delivery) over the same four week period. Electronic mailing lists were set up to facilitate message delivery to groups #2 and #3.

Approval was granted by the OSU Institutional Review Board for Protection of Human Subjects as well as the Director of Human Resources. An informed consent letter providing instructions for being removed from the mailing list, if desired, was delivered along with the first message.

A four-page evaluation survey was developed to assess: 1) Participants' stage of change regarding fat in the diet, 2) Participants' social support network for weight maintenance, 3) Reactions to the program, 4) Impact of the program on weight control behavior, and 5) Demographics. The survey was sent by campus mail about three weeks after the program.

The evaluation was completed by 80.2% of participants: 66 in the print (78.5%), 61 in the print/Byte group (77.2%), and 68 in the electronic group (85.0%). Three questionnaires were unusable. The adjusted response rate was 79.0%. The nine male respondents and the two gender-unidentified respondents were not included in the data analysis to assure homogeneity and a total female population. A total of 181 evaluation surveys were analyzed (74.5%). The mean age of female respondents was 47.8 ± 13.3.

It was hypothesized that electronic delivery of the program (group #3) and/or supplementing the print version of the program with brief electronic tips (group #2) would be associated with higher order stages of change for reducing fat intake. Although the stage of change theory states that people vary in their
readiness for change and move along a continuum of readiness to higher order stages of change, the results from this study did not support the hypotheses. There was no significant difference in stage of change among participants in the three delivery groups. The distribution of participants in each stage of change followed a similar pattern in each group.

There was a significant association (p<.002) between stage of change and the number of positive changes (i.e. finding more ways to increase physical activity, watching fat intake, reading food labels, choosing leaner foods when eating out, eating low-fat snacks, and paying more attention to news about fat substitutes). In general, women in the action and preparation stages tended to make more positive changes than women in the maintenance, contemplation and precontemplation stages.

Most women responded that they received all eight messages. Their perception of message receipt was associated with mode of delivery (group) (p<.001). Those in the electronic group were more certain that they received all the messages.

Almost two-thirds of the women (65%) reported reading all eight of the messages, whereas only 8% reported reading none. Each individual message was read by 44-50% of the women and read and kept by 32-36%. Only 0-2% neither read nor kept the messages. Over 50% reported sharing the messages with someone else, more so with family and co-workers than with friends.

Reactions to the Healthy Weighs program were favorable. A few women criticized the content for a variety of reasons (e.g. not specific to certain topics,
not “new” information, not attention grabbing) while others complemented the program. Seventy-seven percent either “strongly agreed” (37%) or “agreed” (40%) that they looked forward to reading the messages. According to agree/disagree attitudinal statements, women in the print/Byte and electronic group preferred reading the Healthy Weighs messages on e-mail than in a printed hand-out ($p < .001$). Generally, the mode of actual delivery was the preferred mode of delivery ($p < .001$). In addition, most agreed that the messages were about the right length regardless of delivery mode.

An attitudinal question indicated disinterest in participating in on-line chatting about the messages. In addition, relatively few women in the print/Byte group responded to the sharing opportunity in the weekly Byte.

Forty-one percent of the women reported that the messages increased their knowledge “a little”. A similar proportion (42%) reported that the messages reinforced what they already knew. Knowledge change did not differ significantly by delivery mode. Many did report making positive changes as a result of receiving the messages, although their perceptions of behavior change could have been influenced by other information sources (e.g. news/media, other educational materials).

The messages appeared to have the greatest impact on women in the action and preparation stages. Marketing the Healthy Weighs program to women in these stages of change may be the most cost-effective approach.

Since the mode of delivery did not appear to make a difference in whether the women looked forward to the messages, reactions to message
length, how many were read or kept, or resulting knowledge or behavior change, it may not be critical to program effectiveness. Women in the electronic group, however, were more certain that they received all eight messages and were more apt to ask questions of the researcher. The potential cost savings, convenience, and ease of quick communication make it a more attractive option. Access to the technology and participant preference are equally important factors, however.


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APPENDICES
Appendix A
OPA Roundtable Questions and Responses
OPA Roundtable Questions and Responses

1. **How many years you have been at OSU and a member of OPA?**

21 years and an OPA member for 6 years.
6 years, and an OPA member for 5.
25 years this month and I don't know how many years in OPA, something like 7 or 8 years.
I have been at OSU for 29 years.

2. **Can you characterize the OPA membership? Gender? Age?**

Female. 
I think that we have four male members is all. Mostly women and the women are all ages. We have grandparents, and then one women just had a baby not too long ago, really all ages. 
And another thing we have are several women who have their parents living with them or one parent with them.

3. **How interested do think OPA members are in nutrition issues?**

Considering that we had no discussion at the board meeting, everybody said 'sounds good to me'. There really was no discussion.
Everybody said 'Yeah, let's do it!' Everybody was saying 'I need that'.

4. **When OPA members shop for food, how do you think nutrition stacks up in the decision?**

I think nutrition when I go out to buy food. I think 'this is fat free' or 'I should get this low sodium tomato soup'. What happens is that I try it once and then I decide 'this tastes horrible' and then nutrition goes right down and I go with what tastes good. 
Yes. I agree.
I do often look for "light" or "low-fat" or "fat-free", and if I find one that tastes good like fat-free frozen yogurt that's really good then I will choose that over full fat ice cream. 
I look at the labels to see, and I am trying to stay away from as much fat as possible. If I find something that I like that is fat-free or low-fat then I will go back to it, but if it doesn't taste good then I don't waste my money on it. 
Price, too, the better things are for you the higher the price.

5. **Are there any chronic health conditions that may have a nutrition relationship?**

I think that most of the people in our group are leading somewhat of a sedentary lifestyle because their jobs force them into that for 8 hours. 
At this point I am concerned with weight loss and maintenance because I have lost some weight recently and I want to make sure that I keep it off and I want to lose some more.
6. Is that (weight loss) ever a topic of conversation with other folks in the group?

Weight loss? Always.
Whenever women get together, that's all they talk about.
I think that some of the OPA members, or at least some of them are, in their forties or approaching forties and are looking ahead to osteoporosis and some of the aging diseases that might be prevented with food.
Arthritis. Yes. Blood pressure related to stress from jobs.
Some of us have been talking about menopause and some of the things you can do with that that involves nutrition.

7. What nutrition information sources do you or group members use? If you were looking for nutrition information where would you go?

We pretty much discuss it up on the floor. We are always talking about if somebody found something new or if they read a book or an article, we just share it.
The other way I want to look at something is I just do a computer search. If I hear that some miracle vitamin is going to do this then I just search the name of the vitamin.

8. So you are probably on the forefront, perhaps, of people who know how to access that information?

Most people would not take that initiative. It (information) would have to arrive in your e-mail box.
I don't even know how to use the web. I only know how to do the search which is to push a button.
When we talk about e-mail or that sort of thing, people on the board all sit and look at us so I don't think that it is something that people are real familiar with.
That's one of the things that I have been wanting to do. When I send out the reminder for the luncheon, I want to find out how many people even have access to it.
Frankly, as we were saying before, if you send it in paper copy (the minutes) it's going to sit in my tray until I have time to get it. If you send it to me via e-mail, I will read it the same day that I get it.
I agree. I agree.
Or if I don't have time to read it, I will print it off and stick it in the box.
At least I know it is there.
I don't even always check that stuff right away, but I do check my e-mail right away.

9. Do you feel that your supervisors would want you to be doing this before 8 AM and after 5 PM or during the noon hour? What structure (s) in various work situations might not be perceived as the days responsibilities?

Is it just a matter of reading some things?
It wouldn't be a problem for me. It wouldn't be a problem for me. Me either.
10. Are you aware of any OPA members who have changed their diets for health reasons in recent years?

I know a woman who started a lifestyle change. You are talking about other than weight loss? Yes, I know of members who have lost weight. Our jobs are sedentary, whereas before we had to get up and file things and retrieve things. Now we've got a computer and we just do everything on there and don't move a whole lot. Now you don't have to run things across campus, you just fax it. (Agreement) Or e-mail it, or ask a student worker.

I think that now more than ever our jobs have become sedentary in addition the fact that we are all getting to that sedentary age anyway. I used to run up the stairs in the administration building from the basement to the 7th floor, and if I tried right now, I'd collapse.

11. Do think that members are confused about seemingly conflicting nutrition information?

I am. (Agreement) One example is the butter/margarine conflict "Don't eat butter, eat margarine and eat butter, not margarine". Or take calcium supplements and then they don't work if you are not taking the other right thing with them. Or drink decaf coffee and then don't drink decaf coffee. There's a lot of conflicting information from so called experts. Or Chinese food is not good for you and Italian food is not good for you.

12. Are there any topics off of the top of your head that you think people might be interested in?

How to eat healthy but fun. Food labels. Besides all the fruits, vegetables and grains, there must be something you can eat that isn't boring. Which junk foods are healthy? or the healthiest junk foods. We did a study and found that pretzels are the only thing so far this year we have eaten 35 pounds of pretzels! Things that you can grab out of the vending machine. Are the things in the vending machine that say fat-free actually fat-free? The things that say no-fat and low-fat. Quite often that low-fat means that instead of 60% fat they have 58% fat. Some of the terminology on the labels don't always make sense. I know that there is polyunsaturated and the good fat and the bad fat and things that unless you sit down and delve into them, I have no idea what half of them mean. What's a serving? How unreal the basic food groups are, how could you possibly eat that much food in one day? The pyramid.
I'd like to have a description of the various vitamins and whether or not we should take vitamin supplements. We hear a lot about beta-carotene and vitamin E. Garlic pills. Naturopathic cures.

13. Would you prefer a potpourri of topics or would it be better to have a theme and have all of the fact sheets related to that theme?

People would get bored (if it is all with one theme)

14. What do you think is the maximum length?

Not more than one screen which is about half of a page. I don't mind reading something that is a page and a half but I have to know that there is more at the end of each screen. It has to be something that I am really interested in or I won't read it. I'll read the screen and if it hasn't grabbed me by then I won't read the rest. Another option would be to do bite size pieces with greater regularity. Like two or three times a week. You might get people to look at them and go all the way through if there was a little hint or a little tip on the bottom. Something like eat sorbet instead of yogurt. Something applicable to what we are doing that we might take back with us.

15. Do feel that the first of the year is a time of year when people will be receptive to this kind of project?

I think that people would be more receptive because it is after the holidays. And right after the holidays everybody says, "You know, I really should have paid closer attention to nutrition."

16. Do you think that two months is too long (for a nutrition education program)? Should it be contained?

It would be if you were doing it all on the same topic. If they are going to be short ones and you had three or four short ones on cutting fat in the diet and the next one had to do with heart attacks or the next one could be osteoporosis or it could be snacking away from home. So maybe if we had two week blocks. You could, but that also may depend on how broad the topic is. For instance, the heart attack one you might be able to get all on one or two screens. One thing I wanted to say that I am least interested in is recipes.
Appendix B
Print Version of Healthy Weighs Messages
There's good news for women...going to extremes in diet and exercise is not necessary to improve your health. There is mounting evidence that achieving and maintaining a "healthy weight" has a significant impact on health and quality of life.

Excess weight increases women's risk for at least five of the leading causes of death...heart disease, stroke, diabetes, atherosclerosis, and some types of cancer. In addition, women are vulnerable to the many societal, economic and emotional stigmas associated with being overweight.

How much should you weigh? Recommended weight is controversial. A study published in 1994 found that those who are extremely overweight or underweight live shorter lives. According to the study, being slightly overweight during the middle years favored greater longevity.

Yet, new research from Harvard Medical School suggests that "thinner is better". The evidence challenges that belief that lean people die sooner than those of average weight. In their 16-year study of 115,000 female nurses, the lowest death rate was found among those who were 15% below the average weight for their height.

The findings of this study call into question the 1990 governmental guidelines which allowed for a 10-to-15-pound weight gain for adults over 35. The healthy weight ranges in the recently revised 1995 Dietary Guidelines for Americans no longer include this cushion of creeping pounds for aging adults. There is abundant data showing that no matter where in the lifecycle, excess weight leads to an increase in disease incidence.

Some experts are advising women to use the 1959 Metropolitan Life Insurance weight guidelines (which are lower than some other recommendations):

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'11&quot;</td>
<td>96-107</td>
</tr>
<tr>
<td>5' 0&quot;</td>
<td>101-113</td>
</tr>
<tr>
<td>5' 1&quot;</td>
<td>104-116</td>
</tr>
<tr>
<td>5' 2&quot;</td>
<td>107-119</td>
</tr>
<tr>
<td>5' 3&quot;</td>
<td>110-122</td>
</tr>
<tr>
<td>5' 4&quot;</td>
<td>113-126</td>
</tr>
<tr>
<td>5' 5&quot;</td>
<td>116-130</td>
</tr>
<tr>
<td>5' 6&quot;</td>
<td>120-135</td>
</tr>
<tr>
<td>5' 7&quot;</td>
<td>124-139</td>
</tr>
<tr>
<td>5' 8&quot;</td>
<td>128-143</td>
</tr>
<tr>
<td>5' 9&quot;</td>
<td>132-147</td>
</tr>
<tr>
<td>5'10&quot;</td>
<td>136-151</td>
</tr>
<tr>
<td>5'11&quot;</td>
<td>140-155</td>
</tr>
</tbody>
</table>

The lower weights in each range are intended for people with less muscular physiques.

The risk for disease is "graded"...the further outside the guideline, the higher the health risk. A few pounds outside the range will not make or break your health. Researchers, claim, however, that even a modest reduction of 5 to 10 percent of body weight is beneficial for health!

Our "On line" messages will give you pointers for achieving and maintaining healthy weight.

DID YOU KNOW?
The media's idea of an ideal body size is only attained by 5% of the female population.
Message # 2: "The Whys of Exercise"

Hippocrates, the founder of modern medicine, once said, "Eating alone will not keep a man well; he must also take exercise."

The best possible advice for trying to achieve and maintain a healthy weight is to BALANCE CALORIES WITH PHYSICAL ACTIVITY. If you're sedentary, try to become more physically active...more physical activity is always better than less!!

One thing is clear from the hundreds of studies of weight control conducted in the last 20 years...without regular physical activity, weight maintenance usually can't be achieved.

A common reason that women give for not exercising is lack of time. In response, fitness enthusiasts might say that it's a matter of setting priorities. Scheduling fitness into the day should be like making time for any other important appointment.

Try to do 30 minutes or more of moderate physical activity on most—preferably all—days of the week. Examples of moderate physical activity for healthy U.S. adults include:

Walking briskly (3-4 mph), house cleaning, mowing the lawn, golf, home repair (e.g., painting), bicycling (8-10 mph), dancing, and swimming (moderate effort).

The activity doesn't have to be strenuous. Being more physically active really means more movement throughout the day. The key is to find something that you enjoy and make it part of your life. Consider finding a friend to join you. Having a buddy can make exercise more fun (and is helpful on the days when you just don't feel like exercising!).

Walking has become a very popular fitness activity in the U.S. There are many ways to incorporate more walking into your work day such as parking in the farthest lot, walking on coffee breaks or during lunch hours, hand delivering a message across campus, or taking the stairs instead of the elevator. The idea is to add extra steps to what you normally do. It's all the small changes that can add up to big results in terms of lifelong health!

And remember, if you've been ill, busy or just generally too preoccupied to exercise, try to let go of guilt and pick up where you left off. Everyone gets sidetracked from exercise at some time. The solution is to think positively and start up again!

?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ???
Did you know?

Fitness participation declined 10% between 1986 and 1990, according to a new study. Among 22 activities, only walking, bicycling, and basketball gained in popularity.

?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ?? ??

SP 50-787
January 1996
Reducing sources of dietary fat is an especially good idea for those trying to limit calories. The fat in food provides many calories but few vitamins and minerals. So, decreased fat intake results in fewer calories without a reduction in most nutrients.

Health experts recommend that we get no more than 30% of our calories from fat, yet the average American diet contains about 34% fat calories.

Avoiding too much fat doesn’t mean “Never eat cheese” or “Never eat ice cream” because they contain fat. You may want to moderate your intake of these and other high-fat foods, but you need not eliminate them completely from your diet. Instead, a goal might be to balance high-fat foods with other foods that contain less fat. It’s the TOTAL amount of fat and saturated fat in the diet that matters. When aiming to reduce the total fat in the diet, think of the whole day, the whole weekend, or the whole week.

The following examples of how to “moderate” fat in the diet may help in the quest for healthier weights. Again, it’s the small changes that can add up to a big difference in fat intake:

* Substitute lowfat yogurt, buttermilk or skim milk in recipes whenever possible.
* Watch for hidden fats in frosting, sauces, gravies, and chips or crackers.
* Use higher fat cheeses in lesser amounts as a flavor enhancer or else try the reduced fat options.
* Broil, grill, steam or poach meat, poultry, and fish.
* Opt for chicken without the skin.
* Lighten the amounts of fats used at the table (butter, margarine, salad dressing, and gravy).
* Choose fruits and vegetables for snacks.

A great way to limit fat in your diet is to increase foods rich in complex carbohydrates such as whole-grain breads and cereals, pasta, rice, and dried peas and beans. And remember that fruits and vegetables are nutrient-dense and naturally low in fat...try cutting up a few carrot sticks and dunking them in reduced fat salad dressing, slicing up a banana on your morning cereal, or munching on dried fruits instead of a candy bar.

Making a decision to adopt a low-fat healthy eating plan is like making an investment. It will make it easier to control your weight and it will help to keep your heart healthy.

**DID YOU KNOW?**

A "mammoth" muffin contains about 36 grams of fat (almost as much as 3 scoops of your favorite ice cream!).
Message #4: “Clues on the new food label”

The next time you’re shopping, take a few extra minutes to read the food labels. You’ll be amazed by what you can learn about the foods you’re eating! They can help you maintain a healthy weight.


First check the SERVING SIZE. Serving sizes have been standardized to make it easier to compare different foods. They’re listed in common household measures (such as cups) and reflect amounts eaten by most people.

Look for CALORIES per serving as well as CALORIES FROM FAT. If many of the calories come from fat, that food may not be the best choice for maintaining a healthy weight.

The “PERCENT DAILY VALUE” column also gives clues to best choices. Daily Values are nutrient goals that are based on a 2,000 calorie diet. Your own calorie needs may actually be more or less, but this is a simple standard of comparison. (Sedentary women need about 1,600 calories; moderately active women need about 2,200 calories.)

Americans are advised to limit fat to 30% of daily calories. With a 2,000 calorie diet, that’s a maximum of 65 grams of fat per day.

Look at the Percent Daily Value next to TOTAL FAT on the label. How much does one serving of the food contribute to the “fat allowance”? If it’s high, that food may not be the best choice for maintaining a healthy weight. For example, a slice of angel food cake with 0% of the Daily Value for fat is a healthier choice than a slice of chocolate pie with 19% of the Daily Value for fat.

Healthy diets are high in carbohydrates. Look for foods with a high Percent Daily Value for TOTAL CARBOHYDRATES.

On most labels, Percent Daily Values are also listed for two minerals (iron and calcium) and two vitamins (A and C). In this case, it’s nutritionally wise to select foods with higher Daily Values. Look for “nutrient dense” foods that have high Daily Values for vitamins and minerals in comparison to their calories.

Which of these would be a better choice?

LOW FAT PRETZELS
130 calories per 1.25 ounce bag
Vitamin A 0%
Vitamin C 0%
Calcium 0%
Iron 8%

CORN CHIPS
200 calories per 1.25 ounce bag
Vitamin A 0%
Vitamin C 0%
Calcium 2%
Iron 0%

The low fat pretzels have fewer calories and more iron. That makes them more nutrient dense than the corn chips which provide just 2% of the calcium we need.

DID YOU KNOW?
Fifty-four percent of women report that they always read the label for information on nutrition and ingredients the first time they buy a food product.

SP 50-788 January 1996
The average American is eating less fat, yet the prevalence of overweight is on the rise. This puzzles health experts.

It's been hypothesized that an overemphasis on low-fat foods is leading to the alarming increase in overweight Americans. It seems that many persons believe that if a food is low in fat, they can eat as much as they want without gaining weight.

If you simply want to eat less fat, reduced fat snacks are a way to enjoy some of your favorite foods. But, if you're trying to lose weight or maintain your weight, the amount of food and calories consumed is very important. And low-fat foods count, too!

To meet government standards, a "lowfat" food must have 3 grams of fat or less per serving; a "reduced fat" food must have 25% less fat than its regular counterpart; a "light" food must have one-third fewer calories or 50% less fat. When a food (such as peanut butter) is high in fat, even a 25% reduction may not make it a low calorie food. In contrast, if a food (such as saltine crackers) is already low in fat, the savings in switching to a fat-free version is negligible.

Some reduced fat products provide meaningful savings, but not all. Be aware that the calories may only be slightly lower in reduced fat products:

<table>
<thead>
<tr>
<th>Fat/grams</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Chocolate chip cookie</td>
<td>80</td>
</tr>
<tr>
<td>Reduced fat version</td>
<td>70</td>
</tr>
<tr>
<td>3 Sandwich cookies</td>
<td>160</td>
</tr>
<tr>
<td>Reduced fat version</td>
<td>140</td>
</tr>
</tbody>
</table>

16 Wheat crackers | 140 |
Reduced fat version | 120 |

2 T. Peanut butter | 190 |
Reduced fat version | 190 |

17 Potato chips | 160 |
Reduced fat version | 130 |

It's important to consider calories along with fat. Remember, a handful of low-fat crackers will provide far more calories than a couple of their regular fat counterparts.

DID YOU KNOW?
Recent research found that messages about the fat content of a food can influence calorie intake. Women who thought they had eaten a low fat/low calorie yogurt "appetizer" before lunch consumed more calories at the meal than those who thought their yogurt was high fat/high calorie.

Nutrition Facts
Serving Size 1/2 cup (114g)
Servings Per Container 4

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>Calories 90</th>
<th>Calories from Fat 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fat</td>
<td>2g</td>
<td>5%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>0g</td>
<td>0%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0mg</td>
<td>0%</td>
</tr>
</tbody>
</table>

Energy: 30/30/30/30
Message #6: “Fat Substitutes”

As Americans strive to lower the fat in their diets, food companies are responding with fat replacements. Two types have been developed: one is calorie-reduced and the other is calorie-free.

The CALORIE-REDUCED fat substitutes are made from proteins or carbohydrates. They’re actually digested by the body, but just contribute fewer calories. Perhaps the best-known fat replacement of this type is Simplesse.

Simplesse was approved by the Food and Drug Administration (FDA) in 1990. It’s made by altering proteins in such a way as to create the creaminess that we associate with fat.

Simplesse cannot be used for frying or baking because it gels when heated. Currently it’s only approved for use in commercial frozen dairy desserts and cheese spreads. It’s not available for home use.

The CALORIE-FREE fat substitutes are compounds that the body does NOT digest or absorb. In other words, like some fiber, they pass right on through our digestive system. Companies must petition the FDA to approve these substances as food additives.

One example is olestra. The FDA recently approved its use in salted snacks and crackers. Olestra is a fat replacer that looks like fat, cooks like fat, and gives foods all the rich taste and mouth feel of ordinary fat.

Proctor and Gamble, the manufacturer of olestra, has submitted more than 150 studies on olestra’s safety. An FDA advisory committee met in November to review the safety data. Most members agreed that olestra would be of no harm. It, however, has been associated with unpleasant side effects such as abdominal cramping and loose stools. Manufacturers will be required to add fat-soluble vitamins to products because olestra inhibits their absorption. For these reasons, the FDA will require a warning label on packages of foods made with olestra.

Some skeptics say that fat substitutes only encourage people to eat too much food and overindulge. Of course, fat substitutes aren’t magic but they can offer a low-fat alternative to high-fat foods. Used wisely, fat substitutes can help women reduce dietary fat to achieve and maintain a healthy weight.

DID YOU KNOW?
A recent consumer survey found that 89% of Americans — roughly 170 million people — consume “lite” products.
Message #7: "Fast food lightens up"

"Light" foods and beverages have become ingrained in the American culture. And the demand for them is growing. Sixty-one percent of consumers would like to have additional light products available.

Thus far, fast food chains have not found great success in low-fat entrees. McDonald's McLean deluxe burger fizzled. Fast food patrons are more likely to order a side of fries than the once new side salads. Nevertheless, many fast-food chains are offering lighter entrees, beverages and desserts.

Taco Bell has come out with new leaner menu items called "Border Lights". All of these items have 50% less fat and slightly fewer calories. For example, the regular soft taco has 220 calories and 11 grams of fat. The light version has 180 calories and 5 grams of fat.

Burger King offers a broiled chicken salad with 200 calories and 10 grams of fat—a good choice for taste and health. Compare that to their chicken sandwich which has 700 calories and 43 grams of fat—just about the same as McDonald's Whopper with Cheese.

McDonald's does have a few leaner offerings worth noting. At breakfast, try an English muffin (170 calories and 4 grams of fat) or an apple bran muffin (180 calories and 0 grams of fat). (Go easy on the margarine!) At lunch, try a chicken fajita (190 calories and 8 grams of fat) or a chef salad (170 calories and 9 grams of fat). And for a lighter dessert, try the lowfat frozen yogurt cone with only 1 gram of fat and 110 calories.

Remember, some of the "light" items are still high in calories and fat. For example, Taco Bell's Border Lights taco salad has 55% less fat (25 grams), but still 680 calories.

To make the best choices for a weight-watching diet, check nutrient information. Most fast food restaurants have pamphlets which list nutrients in their menu items. Be sure to look for leaner options and don't be afraid to ask how an item is prepared (such as fried or broiled). Most places will special order your food if you ask (such as "hold the mayonnaise")

DID YOU KNOW?
One packet of regular salad dressing at McDonald's has more fat and calories than a hamburger.
Message #8: “Snack Attacks”

Chances are that most of you grew up thinking of snacking as a bad habit. But that mid-afternoon nibble isn't necessarily a "no-no". The next time you get the munchies, first consider the merits of the food.

Familiar, wholesome foods with minimal processing can provide you with an energy boost along with important vitamins and minerals. Soft drinks, chips, candy and other concentrated sweets provide calories but little else.

All of these have about 100 calories:

- 4 cups air-popped popcorn (without added fat!)
- 5 vanilla wafers
- 1 large apple
- 1 ounce pretzels
- ½ cup frozen yogurt
- 1½ oranges
- 1½ fat-free fig bars
- 30 grapes
- ¼ cup dried apricots

Any of the above snacks probably won't hit the spot if you're craving a rich creamy ice cream cone. And a fat-free version of pound cake probably won't cut it if you crave fudge chocolate cake. The fat-free calories are really only worth it if they can satisfy in one serving. If not, you’re better off letting yourself eat your favorite snacks, but in small amounts. The key word is moderation—both in frequency and portion size.

Some people find it easier to give up favorite foods completely, rather than to restrict them. If that's true for you, eat your "semi-favorite" foods so you won't feel completely deprived (such as hard candies instead of chocolate).

If chips are your favorite snack, browse the grocery store for new low-fat and fat-free varieties. Many companies have come out with baked corn chips and reduced-fat potato chips. They're a good alternative if you keep the serving size in mind. Check labels for calorie content.

DID YOU KNOW?
The vending machines on campus have several healthier snack choices including microwave popcorn, pretzels, and fat-free cookies.

Oregon State University Extension Service offers educational programs, activities and materials—without regard to race, color, religion, sex, sexual orientation, national origin, age, marital status, disability, and disabled veteran or Vietnam-era veteran status—as required by Title VI of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and Section 504 of the Rehabilitation Act of 1973. Oregon State University Extension Service is an Equal Opportunity Employer.
Appendix C
Electronic Version of Healthy Weighs Messages
Message #1: "Defining Healthy Weight"

There's good news for women.....going to extremes in diet and exercise is not necessary to improve your health. There is mounting evidence that achieving and maintaining a "healthy weight" has a significant impact on health and quality of life.

Excess weight increases women's risk for at least five of the leading causes of death....heart disease, stroke, diabetes, atherosclerosis, and some types of cancer. In addition, women are vulnerable to the many societal, economic and emotional stigmas associated with being overweight.

How much should you weigh? Recommended weight is controversial. A study published last year found that those who are extremely overweight or underweight live shorter lives. According to the study, being slightly overweight during the middle years favored greater longevity.

Yet, new research from Harvard Medical School suggests that "thinner is better". The evidence challenges the belief that lean people die sooner than those of average weight. In a 16-year study of 115,000 female nurses, the lowest death rate was found among those who were 15% below the average weight for their height.

The findings of this study call to question the 1990 governmental weight guidelines which allowed a 10- to 15-pound weight gain for adults over 35. The healthy weight ranges in the recently revised 1995 Dietary Guidelines for Americans no longer include this cushion of creeping pounds for aging adults. There is abundant data showing that no matter where in the lifecycle, excess weight leads to an increase in disease incidence.

Some experts are advising women to use the 1959 Metropolitan Life Insurance weight guidelines which are lower than some other recommendations:

4 feet 11 inches (96-107 pounds)
5'0" (101-113)
5'1" (104-116)
5'2" (107-119)
5'3" (110-122)
5'4" (113-126)
5'5" (116-130)
5'6" (120-135)
5'7" (124-139)
5'8" (128-143)
5'9" (132-147)
5'10" (136-151)
5'11" (140-155)

The lower weights in each range are intended for people with less muscular physiques.

The risk for disease is "graded"... the further outside the guideline, the higher the health risk. A few pounds outside the range will not make or break your health. Researchers, however, claim that even a modest reduction of 5 to 10 percent of body weight is beneficial for health!

Our "On line" messages will give you pointers for achieving and maintaining a healthy weight.

??? DID YOU KNOW ???: The media's idea of an ideal body size is only attained by 5% of the female population.
Hippocrates, the founder of modern medicine, once said, "Eating alone will not keep a man well; he must also take exercise."

The best possible advice for trying to achieve and maintain a healthy weight is to BALANCE CALORIES WITH PHYSICAL ACTIVITY. If you're sedentary, try to become more physically active...more physical activity is always better than less!!

One thing is clear from the hundreds of weight control studies conducted in the last 20 years...without regular physical activity, weight maintenance usually can't be achieved.

A common reason that women give for not exercising is lack of time. In response, fitness enthusiasts might say that it's a matter of setting priorities. Scheduling fitness into the day should be like making time for any other important appointment.

Try to do 30 minutes or more of moderate physical activity on most - preferably all - days of the week...Examples of moderate physical activity for healthy U.S. adults include:

Walking briskly (3-4 mph), house cleaning, mowing the lawn, golf, home repair (e.g., painting), bicycling (8-10 mph), dancing, and swimming (moderate effort).

The activity doesn't have to be strenuous. Being more physically active really means more movement throughout the day. The key is to find something that you enjoy and make it part of your life. Consider finding a friend to join you. Having a buddy can make exercise more fun (and is helpful on the days when you just don't feel like exercising!).

Walking has become a very popular fitness activity in the U.S. There are many ways to incorporate more walking into your work day such as parking in the farthest lot, walking on coffee breaks or during lunch hours, hand delivering a message across campus, or taking the stairs instead of the elevator. The idea is to add extra steps to what you normally do. It's all the small changes that can add up to big results in terms of lifelong health!

And remember, if you've been ill, busy or just generally too preoccupied to exercise, try to let go of guilt and pick up where you left off. Everyone gets sidetracked from exercise
at some time. The solution is to think positively and start up again!

??? Did you know ??? Fitness participation declined 10% between 1986 and 1990, according to a new study. Among 22 activities, only walking, bicycling, and basketball gained in popularity.
Reducing sources of dietary fat is an especially good idea for those trying to limit calories. The fat in food provides many calories but few vitamins and minerals. So, decreased fat intake results in fewer calories without a reduction in most nutrients.

Health experts recommend that we get no more than 30% of our calories from fat, yet the average American diet contains about 34% fat calories.

Avoiding too much fat doesn’t mean "Never eat cheese" or "Never eat ice cream" because they contain fat. You may want to moderate your intake of these and other high-fat foods, but you need not eliminate them completely from your diet. Instead, a goal might be to balance high-fat foods with other foods that contain less fat. It’s the TOTAL amount of fat and saturated fat in the diet that matters. When aiming to reduce the total fat in the diet, think of the whole day, the whole weekend, or the whole week.

The following examples of how to "moderate" fat in the diet may help in the quest for healthier weights. Again, it’s the small changes that can add up to a big difference in fat intake:

* Substitute lowfat yogurt, buttermilk or skim milk in recipes whenever possible.
* Watch for hidden fats in frosting, sauces, gravies, and chips or crackers.
* Use higher fat cheeses in lesser amounts as a flavor enhancer or else try the reduced fat options.
* Broil, grill, steam or poach meat, poultry, and fish.
* Opt for chicken without the skin.
* Lighten the amounts of fats used at the table (butter, margarine, salad dressing, and gravy).
* Choose fruits and vegetables for snacks.

A great way to limit fat in your diet is to increase foods rich in complex carbohydrates such as whole-grain breads and cereals, pasta, rice, and dried peas and beans. And
remember that fruits and vegetables are nutrient-dense and naturally low in fat...try cutting up a few carrot sticks and dunking them in reduced fat salad dressing, slicing up a banana on your morning cereal, or munching on dried fruits instead of a candy bar.

Making a decision to adopt a low-fat healthy eating plan is like making an investment. It will make it easier to control your weight and it will help to keep your heart healthy.

??? DID YOU KNOW ??? A "mammoth" muffin contains about 36 grams of fat (almost as much as 3 scoops of your favorite ice cream!).
Message #4 "Clues on the new food label"

The next time you’re shopping, take a few extra minutes to read the food labels. You’ll be amazed by what you can learn about the foods you’re eating! They can help you maintain a healthy weight.


First check the SERVING SIZE. Serving sizes have been standardized to make it easier to compare different foods. They’re listed in common household measures (such as cups) and reflect amounts eaten by most people.

Look for CALORIES per serving as well as CALORIES FROM FAT. If many of the calories come from fat, that food may not be the best choice for maintaining a healthy weight.

The "PERCENT DAILY VALUE" column also gives clues to best choices. Daily Values are nutrient goals that are based on a 2,000 calorie diet. Your own calorie needs may actually be more or less, but this is a simple standard of comparison. (Sedentary women need about 1,600 calories; moderately active women need about 2,200 calories.)

Americans are advised to limit fat to 30% of daily calories. With a 2,000 calorie diet, that’s a maximum of 65 grams of fat per day.

Look at the Percent Daily Value next to TOTAL FAT on the label. How much does one serving of the food contribute to the "fat allowance"? If it’s high, that food may not be the best choice for maintaining a healthy weight. For example, a slice of angel food cake with 0% of the Daily Value for fat is a healthier choice than a slice of mince pie with 17% of the Daily Value for fat.

Healthy diets are high in carbohydrates. Look for foods with a high Percent Daily Value for TOTAL CARBOHYDRATES.

On most labels, Percent Daily Values are also listed for two minerals (iron and calcium) and two vitamins (A and C). In this case, it’s nutritionally wise to select foods with higher Daily Values. Look for "nutrient dense" foods that have high Daily Values for vitamins and minerals in comparison to their calories.

Which of these would be a better choice?
LOW FAT PRETZELS
130 calories per 1.25 ounce bag
Vitamin A 0%
Vitamin C 0%
Calcium 0%
Iron 8%

CORN CHIPS
200 calories per 1.25 ounce bag
Vitamin A 0%
Vitamin C 0%
Calcium 2%
Iron 0%

The low fat pretzels have fewer calories and more iron. That makes them more nutrient dense.

??? DID YOU KNOW ??? Fifty-four percent of women report that they always read the label for information on nutrition and ingredients the first time they buy a food product.
The average American is eating less fat, yet the prevalence of overweight is on the rise. This puzzles health experts.

It's been hypothesized that an overemphasis on low-fat foods is leading to the alarming increase in overweight Americans. It seems that many persons believe that if a food is low in fat, they can eat as much as they want without gaining weight.

If you simply want to eat less fat, reduced fat snacks are a way to enjoy some of your favorite foods. But, if you're trying to lose weight or maintain your weight, the amount of food and calories consumed is very important. And low-fat foods count, too!

To meet government standards, a "lowfat" food must have 3 grams of fat or less per serving; a "reduced fat" food must have 25% less fat than its regular counterpart; a "light" food must have one-third fewer calories or 50% less fat. When a food (such as peanut butter) is high in fat, even a 25% reduction may not make it a low calorie food. In contrast, if a food such as saltine crackers is already low in fat, the savings in switching to a fat-free version is negligible.

Some reduced fat products provide meaningful savings, but not all. Be aware that the calories may only be slightly lower in reduced fat products:

1 Chocolate chip cookie...5 grams fat...80 calories
reduced fat................3....................70

3 Sandwich cookies........7..................160
reduced fat................5..................140

16 Wheat crackers........6..................140
reduced fat................4..................120

2 T. Peanut butter........16................190
reduced fat................12................190

17 Potato chips............10................160
reduced fat................6..................130

It's important to consider calories along with fat. Remember, a handful of low-fat crackers will provide far more calories than a couple of their regular fat
counterparts.

??? DID YOU KNOW ??? Recent research found that messages about the fat content of a food can influence calorie intake. Women who thought they had eaten a low fat/low calorie yogurt "appetizer" before lunch consumed more calories at the meal than those who thought their yogurt was high fat/high calorie.
Message #6: "Fat Substitutes"

As Americans strive to lower the fat in their diets, food companies are responding with fat replacements. Two types have been developed: one is calorie-reduced and the other is calorie-free.

The CALORIE-REDUCED fat substitutes are made from proteins or carbohydrates. They're actually digested by the body, but just contribute fewer calories. Perhaps the best-known fat replacement of this type is Simplesse.

Simplesse was approved by the Food and Drug Administration (FDA) in 1990. It's made by altering proteins in such a way as to create the creaminess that we associate with fat.

Simplesse cannot be used for frying or baking because it gels when heated. Currently it's only approved for use in commercial frozen dairy desserts and cheese spreads. It's not available for home use.

The CALORIE-FREE fat substitutes are compounds that the body does NOT digest or absorb. In other words, like some fiber, they pass right on through our digestive system. Companies must petition the FDA to approve these substances as food additives.

One example is olestra. The FDA recently approved its use in salted snacks and crackers. Olestra is a fat replacer that looks like fat, cooks like fat, and gives foods all the rich taste and mouth feel of ordinary fat.

Proctor and Gamble, the manufacturer of olestra, has submitted more than 150 studies on olestra’s safety. An FDA advisory committee met in November to review the safety data. Most members agreed that olestra would be of no harm. It, however, has been associated with unpleasant side effects such as abdominal cramping and loose stools. Manufacturers will be required to add fat-soluble vitamins to products because olestra inhibits their absorption. For these reasons, the FDA will require a warning label on packages of foods made with olestra.

Some skeptics say that fat substitutes only encourage people to eat too much food and overindulge. Of course, fat substitutes aren't magic but they can offer a low-fat alternative to high-fat foods. Used wisely, fat substitutes can help women reduce dietary fat to achieve and maintain a
healthy weight.

??? DID YOU KNOW ??? A recent consumer survey found that 89% of Americans -- roughly 170 million people -- consume "lite" products.
"Light" foods and beverages have become ingrained in the American culture. And the demand for them is growing. Sixty-one percent of consumers would like to have additional light products available.

Thus far, fast food chains have not found great success in low-fat entrees. McDonald’s McLean deluxe burger fizzled. Fast food patrons are more likely to order a side of fries than the once new side salads. Nevertheless, many fast-food chains are offering lighter entrees, beverages and desserts.

Taco Bell has come out with new leaner menu items called "Border Lights". All of these items have 50% less fat and slightly fewer calories. For example, the regular soft taco has 220 calories and 11 grams of fat. The light version has 180 calories and 5 grams of fat.

Burger King offers a broiled chicken salad with 200 calories and 10 grams of fat - a good choice for taste and health. Compare that to their chicken sandwich which has 700 calories and 43 grams of fat - just about the same as McDonald’s Whopper with Cheese.

McDonald’s does have a few leaner offerings worth noting. At breakfast, try an English muffin (170 calories and 4 grams of fat) or an apple bran muffin (180 calories and 0 grams of fat). (Go easy on the margarine!) At lunch, try a chicken fajita (190 calories and 8 grams of fat) or a chef salad (170 calories and 9 grams of fat). And for a lighter dessert, try the lowfat frozen yogurt cone with only 1 gram of fat and 110 calories.

Remember, some of the "light" items are still high in calories and fat. For example, Taco Bell’s Border Lights taco salad has 55% less fat (25 grams), but still 680 calories.

To make the best choices for a weight-watching diet, check nutrient information. Most fast food restaurants have pamphlets which list nutrients in their menu items. Be sure to look for leaner options and don’t be afraid to ask how an item is prepared (such as fried or broiled). Most places will special order your food if you ask (such as "hold the mayonnaise").
DID YOU KNOW? One packet of regular salad dressing at McDonald's has more fat and calories than a hamburger.
Message #8: "Snacks"

Chances are that most of you grew up thinking of snacking as a bad habit. But that mid-afternoon nibble isn’t necessarily a "no-no". The next time you get the munchies, first consider the merits of the food.

Familiar, wholesome foods with minimal processing can provide you with an energy boost along with important vitamins and minerals. Soft drinks, chips, candy and other concentrated sweets provide calories but little else.

All of these have about 100 calories:

- 4 cups air-popped popcorn (without added fat!)
- 5 vanilla wafers
- 1 large apple
- 1 ounce pretzels
- 1/2 cup frozen yogurt
- 1 1/2 oranges
- 1 1/2 fat-free fig bars
- 30 grapes
- 1/4 cup dried apricots

Any of the above snacks probably won’t hit the spot if you’re craving a rich creamy ice cream cone. And a fat-free version of pound cake probably won’t cut it if you crave fudge chocolate cake. The fat-free calories are really only worth it if they can satisfy in one serving. If not, you’re better off letting yourself eat your favorite snacks, but in small amounts. The key word is moderation--both in frequency and portion size.

Some people find it easier to give up favorite foods completely, rather than to restrict them. If that’s true for you, eat your "semi-favorite" foods so you won’t feel completely deprived (such as hard candies instead of chocolate).

If chips are your favorite snack, browse the grocery store for new low-fat and fat-free varieties. Many companies have come out with baked corn chips and reduced-fat potato chips. They’re a good alternative if you keep the serving size in mind. Check labels for calorie content.

??? DID YOU KNOW ??? The vending machines on campus have several healthier snack choices including microwave popcorn, pretzels, and fat-free cookies.
This is the final "On-Line to Healthy Weighs" message. I thank you for participating in the research study. Soon I will be mailing you a short survey to assess the effectiveness of the messages. I'd greatly appreciate your feedback on this project.
Appendix D
Byte Messages
"BYTE #1"

We’ve received some interesting feedback from message #1 regarding "What is a Healthy Weight?". Some of you have expressed concern about the low recommended weight ranges that we shared. You’ve perhaps seen some weight tables that recommend higher weight ranges. This is true for unisex tables with weight ranges that apply to men as well as women. Men have a higher proportion of lean tissue which weighs more.

Have you seen the Jan. 8th edition of U.S. News and World Report? The feature article is titled, "Are You Too Fat?". It provides information on the 1995 Dietary Guidelines for Americans concerning healthy weight ranges. Not all scientists agree with the new weight ranges that don’t allow creeping pounds over the years.

The weight ranges for women provided in message #1 are suggested by some experts, but surely not the only word on the issue. See the article for more information on defining healthy weight, evidence for a "fat gene", healthy eating recommendations, overweight mysteries, and even what is called "the friend factor" of overeating.

The authors highlight the new dietary guideline emphasizing exercise. One message is clear...one of the best things we can do for our health is to GET MORE ACTIVE!! Experts do still disagree on how much is necessary to achieve a payoff, however.

The article provides a valuable summary of the latest research on diet, exercise and health. Definitely news we all can use!

With that, I’d like to pose a question of the week.....Have any of you found ways to work exercise into your busy schedule?

If so, and you are interested in sharing, please respond to my personal E-mail address (sullivaa@ucs.orst.edu) by Monday, Jan. 29th. I will summarize the responses for you in "BYTE #2" which you’ll receive next week.
"BYTE #2"

Thanks to the eight people who responded to the first "byte" topic. Many of you seem to have found ways to work exercise into your busy schedules. Here are a few highlights from the opportunity for sharing......

*I have signed up for the Faculty/Staff Back Clinic/Conditioning class. The class is fun and the instructor is really good. And I feel great when I go home. I have discovered that the only way that I enjoy exercise is with others. I have set it as a top priority.

*I just make it a priority because of my need to stay in good physical and emotional health and find that I do a better job as a mother and employee if I run at least 6 times per week. If it is nice, I run on the beautiful Covered Bridge Road near campus. It was quite intimidating the first few times but I have been doing it now for over 1 1/2 years and most of the people I see are women, older than "average" and none of us are perfect physical specimens.

*My husband and I have started a "mall walking" plan as of Jan. 2. We get up at 5:30 am and are at the mall by 6:00 and walk for 1/2 hour. It has been surprising to me how this has become a fairly normal way of life. It doesn’t seem to be the dreaded "exercise" I usually associate with "losing weight and 'dieting'". This time we approach it as a lifestyle change. One day and one step, literally, at a time has become our motto.

*In the morning I park in the farthest parking lot away from my building. It’s a good 10 minute brisk walk twice a day. I also belong to an athletic club. As an added incentive, I signed up for the club challenge to earn so many points for working out. If I finish, I get a sweatshirt!! I consider exercise as one of the things that has to be done during the day.

*Like many working people, I have a busy schedule. I work full time, I am a student, a wife, a mother, and a homemaker. I fit step aerobic classes into my schedule M,W,F, and Saturday. Working out relieves a lot of tension and stress which builds up during the course of a busy day. I know that exercise can fit into a busy schedule without giving up the things that are important.

* I have been walking to get my milk and groceries most of the time. I decided to start getting into shape by walking
to work several days of the week. Last month, I started walking downtown once in a while on the weekends. Now that it is getting lighter, I will start walking home after work. The benefits have been amazing. Last week I walked up a flight of stairs and I didn’t have that heavy feeling in my legs like I used to, nor was I breathing as hard. I don’t get colds as easily, my mind is clearer when I get to work and my problem with depression has lessened.

*As I hit 40, almost 9 years ago, the priority to put personal effort into staying fit both mentally and physically moved up to the top of my list. With three school aged children, a husband who owned his own business and a demanding professional job, the only time I could find to get physical exercise was the early mornings. That meant 4:30 AM. This has continued to work for me. I’m addicted to it now. It puts me in a positive frame of mind to greet the events of the day. Of course I go to bed by 10:00 most nights!!

It’s great to hear about the unique and exciting ways you have found to get more physically active.

Now, moving on to this weeks message topic--moderating fat intake and reading the food labels. I’d like to pose a question of the week.......Have any of you found effective ways to lower your fat intake? Lowfat cooking tips? Lowfat foods of interest?

If so, and you are interested in sharing, please respond to my personal E-mail address(sullivaa@ucs.orst.edu) by Monday, Feb. 5th. I will summarize the responses for you in "Byte #3" which you’ll receive next week.
BYTE #3:

Thanks to those who responded to last week's "byte" topic. Here are a few ways that you have found to lower fat in the diet:

* There are great lowfat and nonfat recipes on the Internet. If you have a web browser you can just search "recipe" and you will have many homepages to choose from with thousands of recipes. My personal favorite is falafel.

* Just a couple of things I enjoy. If you are a cheesecake lover, using the simple recipe on the box of Philly lowfat cream cheese makes a delicious cheesecake. It's also very good with nonfat cream cheese, but a different consistency. I've tried both! You can get premade lowfat graham cracker crusts. It's amazing, but Hershey's chocolate syrup is no fat (still high calorie though). I like "I Can't Believe It's Not Butter Light"...even melts on toast. Butter Buds are great on hot foods. There's a delicious caramel corn out now that is no fat!

* I'm vegetarian (except for cheese and an occasional egg). I have a very limited diet at this point because I am not very adventuresome about foods I haven't eaten before (would appreciate some ideas). I eat a lot of grains, fruits and vegetables. I check labels to get breads, etc., that have the lower fat contents but are whole wheat. I buy snacks that I like in the low- or no-fat varieties (pretzels and chips), and cut back from 6+ pounds of cheese per month to 2 or 3. I love french fries, so once in a great while I indulge in 5 or 6.

* An effective way to lower fat intake for me is to simply eat smaller portions, and the way to feel satisfied with less is to chew my food slowly.

* I only buy nonfat milk for starters and remove the chicken skin and rinse cooked crumbled ground beef with hot water in a colander.

I received a few inquiries on topics discussed in messages #3 and #4. One person asked, "How many grams of fat per day would fulfill a particular dietary goal?"

The answer depends on the number of calories consumed. The Dietary Guidelines for Americans recommend limiting fat to 30% of calories. For a 2,000 calorie diet, 65 grams of fat is the maximum (calculated by taking 30% of 2,000 and...
dividing the number by 9 - since there are 9 calories per gram of fat). \((2,000 \times 0.3 / 9 = 65\) grams)

On to subject of this week's messages- "The no-fat calorie trap" and "Fat substitutes"......

Sunsweet has just come out with a new butter and oil replacement. It's called "Lighter Bake" and is made from dried plums and dried apples. You simply replace all or part of the fat with "Lighter Bake". Baked goods made with "Lighter Bake" have 50 to 90 percent less fat.

The product can be found in the baking ingredients aisle of the supermarket, alongside familiar products like chocolate morsels. One 14-oz. jar contains about 1 1/4 cups of "Lighter Bake" and makes about 3-5 recipes. You can also use a combination of fat and "Lighter Bake" to reduce the fat but still maintain some of the taste and texture that fat provides.

A fudge brownie made with "Lighter Bake" has 155 calories and 4 grams of fat. It's surely a fat savings, but remember that when it comes to weight watching, calories matter. There isn't a great savings in calories with "Lighter Bake". It's a good alternative to cut some fat from your diet. Just don't forget to stick to the serving size.

I'd love to hear if you give this product a try. Let me know what you think about baking with it. Are the goodies as tasty? Or have you found other fat/butter replacers that work for you?

If so, and you are interested in sharing, please respond to my personal E-mail address (sullivaa@ucs.orst.edu) by Monday, Feb. 12th. I will summarize the responses next week in the final "byte".
Diet scams are everywhere. And now they have hit the Internet. Recently I have heard about several new scams such as a mail order skin patch that is placed on the back of the hip a little below the waist that supposedly melts the fat away. Another product to hit the scene contains an extract from the fruit of a tree found in India that supposedly reduces the body's synthesis of fat, as well as decreases existing body fat.

Sound to good to be true? If so, then it probably is! There are no miracle solutions for trying to achieve and maintain a healthy weight. Consuming fewer calories and burning more calories through exercise is the only true formula!

One last note, family and friends are important support networks when trying to achieve a healthy weight. Studies spanning several decades have shown that changing eating habits may fail without social support. One study reported that significant others, and family members in particular, were important in supporting behavior changes such as increasing exercise and lowering fat in diet.

This is the final "Byte" as part of the ON-LINE TO HEALTHY WEIGHS MESSAGES. I thank you for participating in the research study. Soon I will be mailing you a short survey to assess the effectiveness of the messages. I'd greatly appreciate your feedback on this project.
Appendix E
Evaluation Survey
"On-Line to Healthy Weighs"
Evaluation Survey

1. Do you often eat low fat cheeses? (check one)
   ___ yes
   ___ no
   ___ I don't eat cheese

2. Do you eat red meat? (check one)
   ___ yes
   ___ no

3. Do you eat chicken? (check one)
   ___ yes
   ___ no
   If yes, do you usually take the skin off? (check one)
     ___ yes
     ___ no

4. Do you often use low-calorie or no-fat salad dressing? (check one)
   ___ yes
   ___ no
   ___ I don't eat salads

5. So you sometimes eat fruit and vegetables as snacks? (Check one)
   ___ yes
   ___ no

6. Do you consistently avoid eating high-fat foods? (check one)
   ___ yes
   ___ no
   If yes, how long have you been avoiding them? (check one)
     ___ more than six months
     ___ less than six months

   If no, please check one of these statements:
     ___ I plan to start avoiding them in the next 30 days
     ___ I plan to start avoiding them in the next 6 months
     ___ I will NOT start avoiding them in the next 6 months

   (over)
7. Have you tried to change your weight in the last year? (check one)
   ___ yes
   ___ no
   If yes, how supportive were co-workers (check one)
     ___ very supportive
     ___ somewhat supportive
     ___ not at all supportive
     ___ support wasn't sought
   If yes, How supportive was your family? (check one)
     ___ very supportive
     ___ somewhat supportive
     ___ not at all supportive
     ___ not applicable

8. Did you receive all 8 of the “On-Line to Healthy Weighs” messages? (check one)
   ___ yes
   ___ no
   ___ not sure

9. For each of the messages, please indicate whether you READ and/or kept them. Indicate NEITHER when appropriate.
   READ KEPT NEITHER SURE
   ___ ___  ___  ___  #1 Defining Healthy Weight
   ___ ___  ___  ___  #2 The Whys Exercise
   ___ ___  ___  ___  #3 Fat: Achieving Moderation
   ___ ___  ___  ___  #4 Clues on the New Food Label
   ___ ___  ___  ___  #5 The Low-Fat Calorie Trap
   ___ ___  ___  ___  #6 Facts on Fat Substitutes
   ___ ___  ___  ___  #7 Fast Food Lightens Up
   ___ ___  ___  ___  #8 Snack Attacks

10. Which best describes your reactions to the “On-Line to Healthy Weighs” messages? (check one)
    ___ The messages increased my knowledge a little bit.
    ___ The messages increased my knowledge a lot.
    ___ The messages reinforced what I already knew.

11. Which of the topics listed in Question 9 were most informative?
    (Please list topic numbers).
    ___ ___ ___ ___ ___ ___ ___
12. Did you share information from the messages with anyone else? (check one)
   ___ yes
   ___ With whom?  ___ coworkers  ___ family  ___ friends
   ___ no

13. Did you use the height/weight chart in Message #1 to evaluate your weight status? (check one)
   ___ yes
   ___ no
   ___ not yet

14. Have you done anything differently AS A RESULT OF receiving the “Healthy Weighs” messages? (Check one for each.) (Check “no” if already doing beforehand.)

   YES  NO  NOT YET
   ___  ___  ___  I’m finding more ways to increase my physical activity throughout the day.
   ___  ___  ___  I’m trying to watch my fat intake.
   ___  ___  ___  I’m reading labels to check the fat/calorie content of foods.
   ___  ___  ___  I’m trying to choose leaner food when I eat at fast food restaurants.
   ___  ___  ___  I’m trying to eat low-fat snacks.
   ___  ___  ___  I’m paying more attention to news about fat substitutes.

15. Have you changed your consumption of any of these foods AS A RESULT OF the “On-Line” messages? (check one for each)

   Increase  Decrease  No change
   ___  ___  ___  Low fat cheeses
   ___  ___  ___  Low cal/lowfat salad dressing
   ___  ___  ___  Fruits and Vegetables
   ___  ___  ___  Chips, pastry, donuts
   ___  ___  ___  Bread, rolls, or muffins without butter or margarine

(over)
16. Please indicate how much you agree or disagree with each of the following statements (SA=Strongly Agree; A=Agree; N=Neutral; D=Disagree; SD=Strongly Disagree)

<table>
<thead>
<tr>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
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</thead>
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<tr>
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</tbody>
</table>

- I looked forward to reading the “Healthy Weighs” messages.
- I’d rather read E-mail about healthy eating than printed fact sheets.
- The messages were about the right length.
- I would have liked to chat on-line with others about the messages.

17. We used three methods of sending “Healthy Weighs” messages to you. One group received printed copies through campus mail. A second group received the same messages by electronic mail. The last group received the printed messages along with a weekly electronic mail tip (“Byte”) that was an opportunity for sharing ideas.

Please rank your format preference below (1=first choice, 2=second choice, 3=third choice).

___ Printed format
___ Electronic format
___ Printed format with electronic mail tips (“Bytes”)

18. What is your age? ___ years

19. What is your gender? ___ male ___ female

20. Are you currently participating in fitness programs? (check one)
___ yes
___ no

If yes, please check all that apply:
___ OSU faculty/staff facilities or fitness programs
___ Community gyms/clubs
___ Other _______________________

Do you have any suggestions for improving the “On-Line to Healthy Weighs” program? If so, please list.
Appendix F
Informed Consent Letters
Hello! I am a graduate student in Nutrition and Food Management here at OSU. I'm working with Dr. Carolyn Raab, the OSU Extension Food and Nutrition Specialist, on a nutrition education project for my Master's thesis. "On-Line to Healthy Weighs" includes both food and exercise tips.

We are very excited that the O.P.A. Board of Directors has given us permission to share my materials with your association. Each week between now and mid-February, you will be receiving one hand-out on healthy eating to maintain a healthy weight. "On-Line to Healthy Weighs" includes topics such as "What clues are on the new food label?" and "Facts about fat substitutes". Please share the messages with friends and family.

At the end, we will be sending you a questionnaire to help us assess whether the project was successful. Thank you and I hope that you will enjoy this learning opportunity!

Sincerely,

Angie Sullivan

Note: The Director of Human Resources has indicated that participation in this nutrition education program is university sponsored and, therefore, work time may be used to read the messages and respond to the evaluation questionnaire. If you prefer not to receive the "On-Line to Healthy Weighs" messages, please respond by e-mail (sullivaa@ucs.orst.edu) by this Friday, Jan. 26th. Your name will be removed from the mailing list as soon as possible.
Hello! I am a graduate student in Nutrition and Food Management here at OSU. I'm working with Dr. Carolyn Raab, the OSU Extension Food and Nutrition Specialist, on a nutrition education project for my Master's thesis. "On-Line to Healthy Weighs" includes both food and exercise tips.

We are very excited that the O.P.A. Board of Directors has given us permission to share my materials with your association. Each week between now and mid-February, you will be receiving one hand-out on healthy eating and one electronic message (titled "Bytes") with an opportunity for sharing. "On-Line to Healthy Weighs" includes topics such as "What clues are on the new food label?" and "Facts about fat substitutes". Please share the messages with friends and family.

At the end, we will be sending you a questionnaire to help us assess whether the project was successful. Thank you and I hope that you will enjoy this learning opportunity!

Sincerely,

Angie Sullivan

Note: The Director of Human Resources has indicated that participation in this nutrition education program is university sponsored and, therefore, work time may be used to read the messages and respond to the evaluation questionnaire. If you prefer not to receive the "On-Line to Healthy Weighs" messages, please respond by e-mail (sullivaa@ucos.orst.edu) by this Friday, Jan. 26th. Your name will be removed from the mailing list as soon as possible.
Hello! I am a graduate student in Nutrition and Food Management here at OSU. I'm working with Dr. Carolyn Raab, the OSU Extension Food and Nutrition Specialist, on a nutrition education project for my Master's thesis. "On-Line to Healthy Weighs" includes both food and exercise tips.

We are very excited that the O.P.A. Board of Directors has given us permission to share the materials with your association. Each week between now and mid-February, you will be receiving two E-mail messages on healthy eating to maintain a healthy weight. "On-Line to Healthy Weighs" includes topics such "What clues are on the new food label" and "Facts about fat substitutes". Please share the messages with female friends and relatives.

At the end, we will be sending you a questionnaire to help us assess whether the project was successful. Thank you and I hope that you will enjoy this learning opportunity!

Sincerely,

Angie Sullivan

Note: The Director of Human Resources has indicated that participation in this nutrition education program is university sponsored and, therefore, work time may be used to read the messages and respond to the evaluation questionnaire. If you prefer not to receive the "On-Line to Healthy Weighs" messages, please respond by e-mail (sullivaa@ucs.orst.edu) by this Friday, January 26th. Your name will be removed from the mailing list as soon as possible.
Appendix G
Evaluation Survey Cover Letter
March 1, 1996

Thank you for participating in our “On-Line to Healthy Weighs” research project.

Your feedback is essential for assessing the effectiveness of the project. Please take a few minutes to complete the enclosed questionnaire and return it by Monday, March 11 via campus mail to: “Healthy Weighs” c/o Extension Home Economics, 161 Milam Hall.

Your responses to the questionnaire will be confidential. The identification number is for mailing purposes only. Your name will not be placed on the questionnaire or associated with responses during analysis or reporting.

We will talk about our project at the March OPA meeting. This will be a good opportunity to discuss any questions or suggestions you might have about weight maintenance strategies.

Upon receipt of your completed questionnaire, we will send you a “Java Buck” to spend at the Java Stop in the Memorial Union.

Thank-you in advance for your time and participation,

Angie Sullivan  Carolyn Raab, PhD, RD
Graduate student in Nutrition  OSU Extension Foods and
& Food Management  Nutrition Specialist

Note to those of you receiving “Healthy Weighs” via e-mail: To minimize the possibility of transmission “glitches”, we sent the messages from the ccmail account of Sandra Strohmeyer (a former OSU Extension Service employee), rather than the ucs account of Angie Sullivan. We apologize if this caused confusion about the source of the messages.
Appendix H
Suggestions for Improving the Healthy Weighs Program
Suggestions for improving the Healthy Weighs program  
(from questionnaire)

Consider the diabetic 1 & 2 ranges. Being a diabetic 2 in great standing, I find the public does not know very much about the food and exercise requirements, the differences in sugars or the value of diabetic cookbooks for food value or health.

Explain difference in oils: Wesson, Canola, etc..., corn, peanut, vegetable, etc...

Please continue it!

It needs to provide “new” information; not what is already out in the popular culture. Reading any common women’s magazine can provide this same information. Your publications should present accurate research on health and weight loss and not regurgitate the misinformation supplied by the diet industry. I would appreciate a publication that placed emphasis on health and not on weight loss. Yes, they are two different things.

Add low fat recipes and tips on how to substitute in recipes to reduce the fat content.

Recipe conversion tips. Sodium and cholesterol information.

Good idea. Plan to keep and read once in awhile.

I’m not in favor of e-mail because I do a great deal of business via e-mail (100-150 messages a day). I thought the height-weight chart was depressing. Those new weights seen unattainable. Also, I have read elsewhere the study was flawed. They eliminated so many ill women that they only had 16 left. So they were generalizing on the basis of a very small sample.

Just that I received printed copies and I would prefer electronic mail. P.S. -- How did I get on this list?

Maybe some no-fat recipes and hints to use a no fat ingredient instead of a high fat item.

Thank you for doing this.

Well done. Leave rhetoric off - keep the message.

Book of good low fat cookbooks, recipes. Encouraging tips for eating less and exercising more.
I like it a lot. Maybe as the program progresses you can get more in-depth on topics - maybe have a topic span several issues (like a 2-part story on a particular topic).

We need an on-campus buddy system for walking, exercise, food information - as in a mini "weight watchers."

Keep it up - any good current information on nutrition, weight-control, etc... good reading. Thank You!

Provide more on fast foods.

More on ordering from restaurant menus. More on portions - what's a serving.

Some alternative quick-fix, high energy recipes would be great. Thank you so much for doing this, I've lost almost 10 pounds and came down from a size 16 to a size 14! Please continue this, it really helps.

I think it was great. Wish it could continue- Thanks.

Not interested. I get too much junk mail.

Keep reinforcing.

Would have liked to see more information for men.

Make sure that it is not gender specific. Only give information that benefits both genders.

Low fat recipes.

I don't have any suggestions at this time, but I looked forward to the information. Also enjoyed the feedback from others and what they were doing. I would like to see this to continue.

Thank you for including me.

Just keep up the good work. Its been great so far.

Recipes

I liked being a part of this program. Would like to see it continue.

I felt that the messages were an excellent summary of current information about healthy eating. I receive a couple of health newsletters and their information did agree with yours. Since I have high cholesterol "289", my interest is in that
direction - and exercise. Also, there are lots of women's issues that could be
added to your message. Sorry this is late - I would love to receive more.

No. But I really enjoyed the information. Could you keep it up? I did learn.
Thank You!!!

I thought it was great! I'm sorry I was gone on vacation when this arrived but I
still want you to know how much I enjoyed all your messages. Wish it could
continue because it is such positive reinforcement for lifestyle changes, but I
understand the time and expense involved. It is us who should thank you... and
I do.

It was too goody-goody! There are many who have overwhelming struggles
with weight and health related side effects (i.e. diabetes). Get real and you
might reel me in!

I really enjoyed it. It was like reading a prevention magazine in bits and pieces.
I never have time to read and it was great getting this important information.
Thank You!

Keep it up.

Really enjoyed this. Hate to see it end.

Recipes - to be exact - how to lighten up old favorites. Good article/Recipes in
recent family circle magazine.

Just a comment. I'm vegetarian and haven't found a low-fat cheese I like. I do
eat less cheese than I did 1 and 1/2 years ago (stomach problems). My weight
loss today is because my stomach won't tolerate much fat since gall bladder
surgery. I have been actively looking for lower fat foods, and ways to get
exercise. Just signed up for faculty/staff fitness class - water exercise for
arthritics.

Periodic updates.

Many of the messages seemed to be focused towards women. Gender neutral
would have been appreciated or identify items if specifically geared towards
women. Overall, I found it interesting and helpful. Good job.

More specific information regarding:

1. Meal planning to achieve goals which reflect target daily
calorie total/fat %/good nutrition according to food
pyramid.
2. Calories burned with various common forms of exercise
The messages came in rapid succession - suggest you space them farther apart. It was almost a nuisance. However, I did stop to read them as time permitted. Hard copy would have been put in a pile until I could get around to it. As a sustainable University “wellness” program, I’d recommend your program (assuming messages come every few weeks, not weekly). It appears to be a good method for communicating the message, in addition to other wellness efforts such as the faculty/staff fitness program. There will be those who don’t want to get the messages, so you’ll always need to give people the option of removing their names from the list. I would not, however, recommend that “chatting” about the messages be allowed on work time (i.e. question 16).

Add ideas for meal ideas or recipes with high fiber/nutritive value. List fruits and vegetables with maximum nutritive content.

Please keep this program going. It makes me more aware of my need to watch my food intake and I feel I’m more careful because of it.

Best of luck to you in your project. Knowledge is power!

Maybe such new information such as...
1. How sugar converts to fat
2. Cellulite control
3. Some good, cheap exercise equipment that will provide variety
4. How to make exercising fun
5. When is the most beneficial time to exercise?
6. Lower abdominal exercises
7. Pros & Cons of liquid diets
8. Can you eat as much non-fat things as you want and still lose weight?
9. Foods that fight diseases

It might be nice to include healthier versions of traditional favorite recipes. A lot of people don’t know how to take a recipe they currently have and make it healthier.

Provide information for both genders, e.g. weight chart, rather than targeting females.

Honestly, they didn’t “grab my attention.” I skimmed through them and discarded.

The analysis questions here don’t speak to my case and my answers should distort the data. I am very knowledgeable on fats/nutrition as this made no changes due to receiving the information. But I would have had I been less...
aware. Seems to me you need to search out or separately categorize responses from those already doing good/great job.

Shorter messages - move in a matrix style - i.e. quick at a glance reference.

Don't assume that everyone wants to lose weight. I weigh more than the amount allotted to my height on the chart, and I am interested in improving my fitness, but I rebel at cultural/social expectations that would have me appear a certain way in order to be "attractive." There is too much anorexia, bulimia, smoking, dieting/deprivation, and low self esteem among women due to these social expectations. Thank You.

How to go about starting any fitness program when you don't know how.