
The Influence of the Healthy Eating for Life Program on Eating Behaviors of Nonmetropolitan Congregate Meal Participants

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Current research indicates that when older adults increase their consumption of fruits and vegetables, they maintain or improve their health. Thus, their quality of life can be improved and health care costs lowered. A purposive sample of older adults (treatment group, n=50; control group, n=51) attending congregate meals participated in this study, with the treatment group receiving four lessons on fruits and vegetables over 4 weeks. The Stages of Change construct of the Transtheoretical Model was used to identify separate stages of change related to fruit- and vegetable-eating behaviors. Pre- versus post-test results showed that the treatment group's consumption of vegetables changed significantly, a positive movement from a lower stage of change (e.g., from Precontemplation, which was 30 percent at pre-test and 12 percent at post-test) to a higher category at post-test (e.g., taking action to change, or maintaining, their fruit- and vegetable-eating behaviors). Based on findings of this study, lessons on fruits and vegetables that include the Healthy Eating for Life Program (HELP) may promote positive changes in eating behaviors of nonmetropolitan participants of congregate meals and should be considered for study with similar older adult populations.

The older adult population in the United States is growing quickly (Price, 2001). The older adult population is projected to increase throughout the next several decades. In 2000, for example, 35.0 million Americans (12.4 percent) were 65 years old and older (Hetzl & Smith, 2001). By 2010, 39.7 million Americans (13.2 percent) will be 65 years old and over, and by 2030, up to 20 percent of the U.S. population will be over age 65 (U.S. Census Bureau, 2000a; U.S. Census Bureau, 2000b). Along with this redistribution of the U.S. population, concerns related to aging may increase, including those related to the health and well-being of the older generation (Rogers, 1999).

For example, the U.S. Department of Agriculture reported that Americans' diets need to improve, including those of the elderly (Basiotis, Carlson, Gerrior, Juan, & Lino, 2002). Although aging is not itself a cause of malnutrition, related risk factors can affect older adults' nutritional intake, contribute to malnutrition (Wellman, Weddle, Kranz, & Brain, 1997), and be "multiple and synergistic" (American Dietetic Association [ADA], 2000). Other factors that may contribute to the dietary status of the members of this growing older population are the types of nutrition messages they receive and their readiness to change diet-related behaviors.

Background

A 1996 report by the American Dietetic Association discussed the increased challenges of competing with conflicting nutrition messages that consumers receive from a variety of sources. The public needs science-based information that not only educates, but also encourages the adoption of more healthful nutrition-related behaviors. An update of this Association's report notes that research is needed to develop and test cost-effective methods for evaluating the efficacy of nutrition education programs. For effective behavior change, nutrition education programs must be based on the target audience's needs, behaviors, motivations, and desires. And the gap between knowledge of nutrition and actual healthful eating practices must be narrowed by providing nutrition information in a usable form to consumers (ADA, 1996).

In the 1970s, Prochaska and colleagues began studying how people make changes. Their efforts led to the development of the Transtheoretical Model, of which the Stages of Change is a construct (Prochaska, Norcross, & DiClemente, 1994). Prochaska, attempting to bring together the components of the major psychotherapy theories regarding how people acquire successful behavior change, found that the many theories could be summarized by principles called the "processes of change." He was especially interested in how "self-changers" progress along a continuum of change—from Precontemplation to Contemplation, Preparation, Action, Maintenance, and Termination—without therapy or a professional program (box 1).

According to this construct, successful change requires that self-changers

know the stage in which they are located and subsequently use appropriately timed strategies. Initial thoughts were that self-changers moved linearly from one stage to the next. In reality, successful self-changers may recycle through the Stages of Change several times before successfully reaching the Maintenance or Termination stage (Prochaska, Norcross, & DiClemente, 1994).

In studies of health behaviors, older adults have been found to fall primarily into the Precontemplation or Maintenance stage, therefore, calling for nutrition education efforts to be targeted at the Precontemplation stage (Nigg et al., 1999), where people do not perceive there is a need to change. The assumption is that people at the Precontemplation stage for adoption of a healthful diet need information that assists them in becoming aware of the personal benefits of healthful eating behaviors (Laforge, Greene, & Prochaska, 1994). Persons in the Maintenance stage—where behavior changes have occurred for more than 6 months—may experience some relapse (Kristal, Glanz, Curry, & Patterson, 1999), may need information about local resources, and may need strategies to help them deal with barriers to maintaining their dietary changes.

Implications for nutrition education programs for older adults include understanding and applying successful program elements, providing a clear plan for education and having that education based on segmented needs of the older population, adapting locally, and using existing services to provide education. These implications point to the need for research of behavior-based nutrition education for older adults (Contento et al., 1995). Thus, this study examines the influence of a nutrition education intervention—the Healthy Eating

for Life Program (HELP)—on the eating behaviors of a select group of older adults that participated in congregate meal programs. Because the scientific evidence supporting the healthful benefits of fruit and vegetable consumption is significant (U.S. Department of Health and Human Services [DHHS], 2000; Tate & Patrick, 2000; Gerrior, 1999), we focus on behavior changes related to the consumption of these food items.

According to current research, older adults may maintain or improve their health by increasing their intake of fruits and vegetables, thus possibly lowering health care costs and increasing their quality of life (ADA, 2000; Gerrior, 1999). Nutrition education curricula for older adults are available for use, but the ability of these curricula to increase the servings of fruits and vegetables consumed by older adults is uncertain (Clarke & Mahoney, 1996; Contento et al., 1995). Hence, more evaluation studies are needed of the influence of nutrition education programs that are designed for older adults at congregate meal sites.

Methods

Subjects

The target population for this study consisted of community-dwelling, nonmetropolitan older adults who attended congregate meal sites. The participants were at least 60 years old (as required for attendance at the congregate meals), with the exception of spouses under 60 years old who could attend meals when accompanying their older spouse.

The treatment group was chosen from three Ohio counties; the control group,

Box 1 – Basic definitions of the Stages of Change Construct of the Transtheoretical Model and operational definitions used in this study	
Basic definition	Operational definition
Precontemplation No intention of changing behavior and does not see a need to change.	<i>Participant consumed fewer than 3 to 4 servings of fruits (vegetables) each day and did not say he or she was seriously thinking about eating more servings of fruits (vegetables) during the next 6 months.</i>
Contemplation Acknowledges need to change behavior and begins to think seriously about doing so during the next 6 months or so.	<i>Participant consumed fewer than 3 to 4 servings of fruits (vegetables) each day and said he or she was seriously thinking about eating more servings of fruits (vegetables) during the next 6 months.</i>
Preparation Plans to take action during the next month to change a behavior.	<i>Participant consumed fewer than 3 to 4 servings of fruits (vegetables) each day and was planning to eat more servings of fruits (vegetables) during the next 30 days.</i>
Action Takes action to change behavior but action has lasted for 6 months or less.	<i>Participant consumed 3 to 4 or more servings of fruits (vegetables) each day and has been consuming this amount of fruits (vegetables) for 6 months or less.</i>
Maintenance Has been practicing a changed behavior for more than 6 months.	<i>Participant consumed 3 to 4 or more servings of fruits (vegetables) each day and has been consuming this amount of fruits (vegetables) for more than 6 months.</i>
Termination Has reached ultimate goal of behavior change, with no concern for relapse.	
Note: Stages of change definitions are by Prochaska, Norcross, and DiClemente (1994).	

from another Ohio county.¹ The Area Agency on Aging, county offices of Ohio State University Extension, and coordinators of the congregate meal sites assisted with site selection, which needed to be more rural than urban or nonmetropolitan.² Fifty treatment and 51 control participants were selected.³

¹The data for this study were collected as part of the multi-State effort to test the lesson plans of the HELP.

²Ohio was selected to provide data from a nonurban population, as part of a coordinated effort to compare data among States.

Survey Instruments

Three instruments were used in this study: a demographics instrument, a questionnaire entitled Checkup on Your Good Eating Practices, and a Stages of Change instrument that consisted of

³The size of the sample was based on guidance from the HELP Elderly Nutrition Education Coordinating Group: Mary P. Clarke, PhD, RD, Kansas State University; Sherrie M. Mahoney, MS, Kansas Extension Service; Jacquelyn McClelland, PhD, RD, North Carolina State University; William D. Hart, PhD, RD, St. Louis University; Denise Brochetti, PhD, Virginia Polytechnic Institute and State University; Alma Montano Saddam, PhD, RD, The Ohio State University.

two subscales—one for fruits and another for vegetables. These instruments were developed by Extension nutrition professionals of the HELP Elderly Nutrition Education Coordinating Group that developed the HELP instructor’s manual.

The demographics instrument collected information on gender, age, race, number in household, educational level, income, how often meals were eaten with someone else, and how often meals and snacks were eaten. Checkup on Your Good Eating Practices consisted of seven questions related to eating fruits and vegetables,

and the Stages of Change instrument consisted of eight separate questions, four each for fruits and for vegetables (box 2). Questions on the Stages of Change instrument asked older adults the number of servings of fruits and vegetables they were eating, how long they had been eating that number of servings, and whether they were seriously thinking of increasing this number either in the next 30 days or in the next 6 months. These questions were based on the criteria of the Transtheoretical Model Stages of Change construct (W.D. Hart, personal communication, October 19, 2001). Thus, the questions were based on a standardized length of time individuals had been working on, or intended to implement, a behavior change.

The Extension nutrition specialists, dietetic nutrition professionals, and county Extension agents (who also field tested the teaching materials) tested the instruments for content and face validity. The instruments were reviewed for content accuracy and suitability for the older adult target audience, after which appropriate adjustments were made.

Extensive field testing addressed any issues related to reliability. Cronbach's Alpha was used to test internal consistency of the instruments. The instrument Checkup on Your Good Eating Practices tested at an alpha of .77. The subscale for Stages of Change for fruit-related behaviors tested at an alpha of .53, and the subscale for Stages of Change for vegetable-related behaviors tested at an alpha of .63. Research in applying the Stages of Change construct to measurement of behavior change of nutritional behaviors is relatively new. Therefore, the alpha levels were considered acceptable (Nunnally, 1967).

Box 2 – Major Survey Instruments¹

Checkup on Your Good Eating Practices: Example questions

(Answer choices: Almost never, Seldom, Often, Almost always, and Doesn't apply.)

What do you do?

Include at least three food groups in my breakfast (e.g., milk, fruit, and grains such as bread and cereal)?

Eat 3 or more servings of different vegetables daily?

Eat at least 1 serving of vitamin A-rich foods daily (e.g., dark green, leafy [spinach, kale, broccoli] and deep yellow [sweet potatoes, cantaloupe, apricots])?

Choose potatoes prepared in lower fat ways (not fried)?

Eat 2 or more servings of different fruits daily?

Choose at least 1 serving of vitamin C-rich foods daily (e.g., orange juice, grapefruit, broccoli, cabbage, tomatoes)?

Include at least 1 serving from each of the five food groups (i.e., grains, fruits, vegetables, meat group, and milk products)?

Stages of Change: Questions

Separate questions were asked for fruit- and vegetable-eating behaviors.

How many servings of fruits (vegetables) do you eat each day?

- 0
- 1 or 2
- 3 or 4
- 5 or more
- Don't know

About how long have you been eating this amount of fruits (vegetables)?

- Less than 1 month
- 1 to 3 months
- 4 to 6 months
- Longer than 6 months
- Don't know

Are you **seriously thinking** about eating more servings of fruits (vegetables) starting sometime in the next 6 months?

- Yes
- No
- I already eat enough
- Undecided

Are you **planning** to eat more servings of fruits (vegetables) during the next 30 days?

- Yes
- No
- I already eat enough
- Undecided

¹HELP evaluation instruments developed by Mary P. Clarke, PhD, RD; Jacquelyn McClelland, PhD, RD; William D. Hart, PhD, RD; and Alma Montano Saddam, PhD, RD of the Elderly Nutrition Education Coordinating Group.

Treatment and Analysis

The HELP was developed as a joint project of the Cooperative Extension Services at Kansas State University, The Ohio State University, North Carolina State University, and St. Louis University. The program's theme focused on having participants depend primarily on food for good nutritional health and encouraging them to eat a variety of nutritious foods even though the adults' calorie needs may have declined. HELP lessons were designed to facilitate movement of nutrition behaviors along a continuum—from being unaware of eating habits and health connections to applying skills to maintain healthful eating behaviors (Clarke & Mahoney, 1996).

The HELP lessons specifically addressed nutritional needs of older adults. The connection between good health and healthful eating habits was emphasized. The fruit and vegetable lessons also presented practical ways for small households to purchase and store fruits and vegetables. Suggestions were shared for preparing fruits and vegetables that are easier to chew; lower in salt, sugar, and fat; and preserve other nutrients. The recipes, varying in texture, flavor, and temperature, were chosen because of their ability to appeal to the changing taste buds of many older adults.

The treatment group was taught a series of four HELP nutrition lessons. The lessons for the first 2 weeks focused on vegetables, with a lesson on potatoes included, while the second 2 weeks focused on fruits. The objectives of the lessons related to the following: suggested number and sizes of servings; vegetables and fruits as sources of various nutrients and few calories; links between eating vegetables and fruits and decreased risk for some diseases; cost-effective purchasing, storage, and preparation

of vegetables and fruits; and vegetables and fruits with less fat, salt, and sugar.

A dish featuring vegetables or fruits was brought to each class for participants to taste. Also, at each of the four sessions, the participants were given handouts of the lessons, "challenges" for planning behavior changes, copies of recipes (including those tasted in class) in the HELP, and educational aids (e.g., refrigerator magnets of vegetables and fruits). For each group (one each from three counties), all lessons were taught in the same order by the researcher who used the same visuals, dishes to taste, and style of presentation. The control group did not receive the weekly lessons. However, after completing the post-test, they were offered a set of handouts and the HELP recipes. Pre- and post-tests, respectively, were administered to the control group from September through December 1998, with these results being used to test and retest the study instruments. The instruments tested reliably below .05, with the exception of the question that dealt with how long the reported number of vegetables had been eaten. This question, however, was accepted as reliable because of the slightly lower number of participants answering the question.

To consider this study quasi-experimental and a nonequivalent control-group design, we made efforts to select similar treatment and control groups. Analysis of the demographics conducted on treatment and control groups was only significantly different on one variable: how often they ate meals with someone else.

For the questionnaire Checkup on Your Good Eating Practices, we summed a score for each treatment and control group participant by using answers from seven questions related to fruit and vegetable behavior (total possible

For vegetable-eating behaviors, the treatment groups' pre-test responses were mostly indicative of Precontemplation, followed closely by Maintenance, and then Preparation

score of 28, after eliminating “doesn’t apply”). A paired-sample *t*-test was used to compare the means of the pre- and post-test scores for each group.

Post- and pre-test matched summed scores were also measured with a sign test. This test determined whether significant differences exist between positive and negative changes from the pre-test to the post-test. These changes, derived by subtracting pre-test from post-test results, were placed into three categories: negative differences, positive differences, or ties (i.e., no change).

For the Stages of Change instrument, we used sign tests to measure differences of matched cases from pre-test to post-test administration, excluding “don’t know” for the number of servings, how long this amount of fruits and vegetables had been eaten, and for computed stages of change for fruit- and vegetable-eating behaviors for participants in both groups. An algorithm was used to calculate a separate stage of change for eating fruits and vegetables (box 1). Pre- and post-test fruit and vegetable stages were calculated for the treatment and control participants, except for those without sufficient data to categorize.

Results

Sample Characteristics

Overall, the older adults in the treatment and control groups were similar. Seventy-six percent of the 50 participants in the treatment group were women, and 92 percent were White. Sixty-seven percent of the 51 participants in the control group were women, and 94 percent were White (data not shown).

Table 1. Post-test/pre-test sign test for Checkup on Your Good Eating Practices regarding fruit- and vegetable-eating behaviors of elderly participants

	Treatment group ¹	Control group ²
	<i>Percent</i>	
Negative differences	32	31
Positive differences	59	43
Ties	9	26

¹n = 44.

²n = 49.

Eating Practices

Results from the questionnaire entitled Checkup on Your Good Eating Practices showed that, compared with the control group, a significant difference existed between the means for the treatment group from the pre-test to the post-test. From the pre- to the post-test, mean scores by the treatment group increased from 20.86 to 22.73 ($p \leq .05$). For the control group, the means were 19.46 at the pre-test and 20.67 at the post-test (data not shown).

For the sign test, although two-tailed significance levels did not show a significant difference in either group’s summed scores, the percentages of negative and positive differences and the ties for the treatment group were noteworthy (table 1). From the pre-test to the post-test, for example, 59 percent of changes by the treatment group were positive, compared with 43 percent of the changes by the control group that were positive. The percentage of ties (no change) was low for the groups (9 vs. 26 percent). These results imply that some type of change took place from pre-test to post-test administration, particularly in how members of the treatment group viewed their eating behaviors.

Stages of Change

Members of the treatment group categorized their fruit-eating behavior most often as Maintenance at the

pre-test and post-test (32 percent each), followed closely by Pre-contemplation at pre-test and post-test (24 and 28 percent, respectively) and Preparation (20 percent each at pre-test and post-test) (table 2). Changes that could not be categorized dropped from 20 percent at pre-test to 4 percent at post-test. Responses reflective of behaviors in the Action category increased from 0 at pre-test to 8 percent at post-test; that is, at post-test, members of the treatment group consumed 3 to 4 or more servings of fruits each day and had been consuming this amount for no more than 6 months.

Among the control group members, pre-test responses regarding their fruit-eating behaviors fell most frequently into Precontemplation, followed by Preparation and Maintenance (43, 25, and 20 percent, respectively). For this group, pre-test and post-test differences were minor among all categories.

For vegetable-eating behaviors, the treatment groups’ pre-test responses were mostly indicative of Precontemplation, followed closely by Maintenance, and then Preparation (30, 28, and 24 percent, respectively). That is, some members of the treatment group had not considered changing their vegetable-eating behavior, some had practiced changing their behavior, and

Table 2. Pre-test and post-test computed Stages of Change for fruit- and vegetable-eating behaviors of elderly participants

Treatment group ¹	Fruits		Vegetables	
Stage of change	Pre-test	Post-test	Pre-test	Post-test
	<i>Percent</i>			
Maintenance	32	32	28	46
Action	0	8	4	10
Preparation	20	20	24	26
Contemplation	4	8	0	0
Precontemplation	24	28	30	12
Cannot categorize	20	4	14	6

Control group ²	Fruits		Vegetables	
Stage of change	Pre-test	Post-test	Pre-test	Post-test
	<i>Percent</i>			
Maintenance	20	18	47	33
Action	2	6	0	4
Preparation	25	19	8	18
Contemplation	2	4	2	2
Precontemplation	43	49	33	33
Cannot categorize	8	4	10	10

¹n = 50.

²n = 51.

others planned to take action during the next month to change their vegetable-eating behavior. At the post-test, members of the treatment group most frequently characterized their vegetable-eating behavior as being related to Maintenance, followed by Preparation, and Precontemplation (46, 26, and 12 percent, respectively), a different pattern than was the case at the pre-test phase. The control group's responses at pre-test were mostly in two categories: Maintenance (47 percent) and Precontemplation (33 percent). The post-test category for Precontemplation remained at 33 percent, but the Preparation category was 18 percent, a change from the pre-test (8 percent). Also, control group participants categorizing their behavior as Maintenance dropped to 33 percent at the post-test phase.

Results from the sign tests revealed no significant difference between pre-test and post-test results for neither the treatment group nor the control group for stage of change related to fruit-eating behaviors nor for the control group for stage of change related to vegetable-eating behaviors (table 3). However, a significant positive change for stage of change for the treatment group's vegetable-eating behaviors existed. This positive change shows movement from a lower stage of change category to a higher category from the pre-test to the post-test.

Limitations of the Study

Findings were limited to the older adults in this study. Participants were not randomly selected because they were attendees of pre-arranged class sites, and some self-selection occurred.

Our findings indicate that the HELP nutrition lessons made a difference . . . in how some older adults in the treatment group thought about changes, planned for changes, or made changes in their fruit- and vegetable-eating behaviors.

Measurable behavior change may have been limited because of the short span of weeks in which treatment took place. Other considerations were (1) the environments of the congregate meal sites that varied in lighting, seating arrangements, distractions, and participant attentiveness and (2) the nutrition education on fruits and vegetables that the control group may have received from other sources prior to this study.

Conclusions

This study specifically examined the influence of nutrition education on the eating behaviors of older adults who resided in nonmetropolitan or semi-rural geographic areas and who were also participants of congregate meal programs. Based on recent trends, the nonmetropolitan or semi-rural older adult population is an important group to focus on because of factors such as the out-migration of younger persons in these areas and the sometimes-segmented nutrition and health care services (ADA, 2000; Rogers, 1999). Further study is recommended of not only this geographic audience but also of a comparison of this audience with *urban* older adults who participate in congregate meal programs.

Our findings indicate that the HELP nutrition lessons made a difference, measured by real and statistical significance, in how some older adults in the treatment group thought about changes, planned for changes, or made changes in their fruit- and vegetable-eating behaviors. Additionally, there is merit to the use and further study of the questions on the Stages of Change instrument for fruit- and vegetable-eating behaviors; that is, for the categorization of older adults' behaviors into the Precontemplation, Contemplation, Preparation, Action, or Maintenance stages.

Table 3. Post-test/pre-test sign test for Stages of Change computed for fruit- and vegetable-eating behaviors of elderly participants

	Treatment ¹	Fruits Percent	Control ²
Negative differences	24		16
Positive differences	22		20
Ties	54		64

	Treatment ¹	Vegetables Percent	Control ²
Negative differences	8		17
Positive differences	41*		5
Ties	51		78

¹n = 37 for fruit-eating behaviors, and n = 37 for vegetable-eating behaviors.

²n = 45 for fruit-eating behaviors, and n = 41 for vegetable-eating behaviors.

*Differences in behavior changes from the pre-test to the post-test are significant, at $p \leq .05$.

Realistically, diets vary over time because of a number of factors—one being changes in foods that are available. Therefore, a more relevant application of the Stages of Change construct, compared with simply measuring eating behavior, may be to measure cognitive and behavioral engagement. This approach allows researchers to focus more on what people are thinking about eating during the process of changing their diet, compared with measuring specific foods and nutrients consumed (Kristal, Glanz, Curry, & Patterson, 1999). This approach also may be more empowering to individuals who are working toward more healthful eating behaviors.

Acknowledgments

This educational program was mainly funded by a grant from USDA's Extension Service and by partial support from the North Carolina Institute of Nutrition, Chapel Hill. This research also was supported by funds from the Dean's Research Incentive Fund of the College of Human Ecology, The Ohio State University. We acknowledge the assistance of the staff of Ohio State University Extension in participating counties; those who assisted at the congregate meal sites; and M.A. (Annie) Berry, PhD, senior statistician of Ohio State University Extension.

References

- American Dietetic Association. (2000). Position of the American Dietetic Association: Nutrition, aging, and the continuum of care. *Journal of the American Dietetic Association, 100*(5), 580-595.
- American Dietetic Association. (1996). Position of the American Dietetic Association: Nutrition education for the public. *Journal of the American Dietetic Association, 96*(11), 1183-1187.
- Basiotis, P.P., Carlson, A., Gerrior, S.A., Juan, W.Y., & Lino, M. (2002). *The Healthy Eating Index: 1999-2000*. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. CNPP-12.
- Clarke, M.P., & Mahoney, S.M. (1996). *A Healthy Eating for Life Program for Mature Adults*. Kansas State University Agricultural Experiment Station and Cooperative Extension Service.
- Contento, I., Balch, G.I., Bronner, Y.L., Lytle, L.A., Maloney, S.K., Olson, C.M., et al. (1995). Nutrition education for older adults. *Journal of Nutrition Education, 27*, 339-346.
- Gerrior, S.A. (1999). Dietary changes in older Americans from 1977 to 1996: Implications for dietary quality. *Family Economics and Nutrition Review, 12*(2), 3-14.
- Hetzel, L. & Smith, A. (2001). *The 65 Years and Over Population: 2000*. Brief C2KBR/01-10. U.S. Census Bureau.
- Kristal, A.R., Glanz, K., Curry, S.J., & Patterson, R.E. (1999). How can stages of change be best used in dietary intervention? *Journal of the American Dietetic Association, 99*(6), 679-684.
- Laforge, R.G., Greene, G.W., & Prochaska, J.O. (1994). Psychological factors influencing low fruit and vegetable consumption. *Journal of Behavioral Science, 17*(4), 361-374.
- Nigg, C.R., Burbank, P.M., Padula, C., Dufresne, R., Rossi, J.S., Velicir, W.F., et al. (1999). Stages of change across ten health risk behaviors for older adults. *The Gerontologist, 39*(4), 473-482.
- Nunnally, J.C. (1967). *Psychometric Theory*. New York, NY: McGraw-Hill.
- Price, C.A. (2001). *The Impact of Demographic Changes on Society*. Presentation at Northwest District Family Nutrition Program In-Service on Aging. Columbus, Ohio.
- Prochaska, J.O., Norcross, J.C., & DiClemente, C.C. (1994). *Changing for Good*. New York, NY: William Morrow and Company, Inc./Avon Books.

Rogers, C.C. (1999). *Changes in the Older Population and Implications for Rural Areas*. Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Rural Development Research Report Number 90.

Tate, M.J., & Patrick, S. (2000). Healthy People 2010 targets healthy diet and healthy weight as critical goals. *Journal of the American Dietetic Association*, 100(3), 300.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010*. Washington, DC.

U.S. Census Bureau. (2000a). *Projections of the Total Resident Population by 5-Year Age Groups, and Sex with Special Age Categories: Middle Series, 2006 to 2010*. Retrieved July 29, 2003, from www.census.gov/population/projections/nation/summary/np-t3-c.txt.

U.S. Census Bureau. (2000b). *Projections of the Total Resident Population by 5-Year Age Groups, and Sex with Special Age Categories: Middle Series, 2025 to 2045*. Retrieved July 29, 2003, from www.census.gov/population/projections/nation/summary/np-t3-f.txt.

Wellman, N.S., Weddle, D.O., Kranz, S., & Brain, C.T. (1997). Elder insecurities: Poverty, hunger, malnutrition. *Journal of the American Dietetic Association*, 97(10 Suppl.), S120-S122.