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\* Presentation of findings at BCC bi-annual meeting, May 1-2, 2003

Note. Abstracts were not available for all BCC project sites. Summary abstracts for all BCC projects will be included in the Final Summary Report, which will be distributed June, 2003.



### **Institution ...**

*Kansas State University*

### **Project Name ...**

*Healthy Youth Places (Youth Environments Promoting Nutrition and Physical Activity)*

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### **Background / Significance of Problem**

To reduce the risk for chronic disease, adolescents should eat at least five servings of fruit and vegetables and be physically active daily. Currently, however, youth are not meeting policy standards for these two health behaviors. During adolescence there is evidence that fruit and vegetable consumption and physical activity decline and that youths' behavioral decisions impact behavior and health through out life. Thus, adolescence may be a critical developmental period to deliver intervention strategies. Results from intervention studies targeting youth health behavior change suggest that schools are a promising setting where interventions can reach a large percentage of youth and be sustained. But, the success of school-based interventions to promote fruit and vegetable consumption and physical activity has been limited. Explanation for these small effects includes a lack of theoretical rationale for the tested intervention and a lack of sufficient implementation by school personnel of the intervention strategy. There is a need for an intervention that targets both diet and physical activity change in middle school students; draws on theory to develop a strategy to achieve health behavior change in students; and draws on theory to develop a strategy to improve the process of sustained intervention implementation in school settings.

### **Research Question**

The Healthy Youth Places Project tested if an intervention strategy that implements school environmental change with adult leader and youth participation will influence and maintain adolescent fruit and vegetable consumption and physical activity. The project developed a place-based dissemination model of multiple levels (project, school, and place) that were hypothesized to build the skills and efficacy of leaders (school staff and youth) to implement environmental changes in the school lunch place and after school place. A second aim of the project was to determine the individual and setting level processes affecting sustained physical activity and fruit and vegetable consumption.

### **Findings To-Date**

- Using an experimental design, middle schools were stratified on setting level variables (school size, concentration of poverty, ethnic diversity) into three groups (large/moderate to high resource; small/moderate to high resource; large, low resource, diverse) and randomized within strata to an intervention (N=8) or comparison (N=8) condition. The health behavior of adolescents was assessed at the middle school during the spring of the 6th grade

(2000 baseline), 7th grade (2001 post-intervention), and 8th grade years (post-intervention 2002). During 2003, the students moved from middle school to their 9th grade year in high school and were assessed (2003 follow-up).

- At baseline, seventy-four percent of 6th grade youth (compared to 20th day enrollment reports) had active parental consent and participated in the data collection. The project was also successful in tracking 76% of the intervention and 68% of the comparison cohort across the first three years of the study. At baseline, a mixed model ANOVA revealed no differences between intervention and comparison schools on the primary outcome measures: Previous Day Physical Activity Recall, and Child and Adolescent Food Frequency Questionnaire. The Healthy Youth Places Intervention schools significantly increased 16 minutes in vigorous physical activity (VPA) over the three year study. There was a significant mixed model VPA intervention effect (Random\*Year,  $F=3.59$ ,  $p=.028$ ). There was a six-minute difference in VPA performed each day post intervention between experimental and comparison schools. No intervention effects were found for fruit and vegetable consumption (F&V). F&V consumption decreased across the study (3.67, 3.43, and 3.09 servings for 6th, 7th, 8th grades).
- The intervention significantly increased the targeted mediator of self-efficacy for school physical activity environmental change over the three years of the study. (Mixed Model random\*year,  $F=12.02$ ,  $p=.0001$ ). Control schools significantly decreased and intervention schools significantly increased in self-efficacy for school physical activity environmental change.

### Implications

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- The intervention process demonstrated that engaging youth and adult leaders within middle schools is an effective method for reaching a broad and representative sample of youth and increasing physical activity behavior. The intervention successfully enhanced the students' perceptions of their efficacy to change the school environment to promote healthy physical activity. Our findings provide evidence that intervention framework that involves youth and adults leaders in a participatory process to build healthy environments can have a significant impact on both the psychosocial development and physical activity of middle school youth over a three-year period.
- We are currently conducting analyses to identify the personal and setting level processes that may mediate the effectiveness of the intervention and may determine sustained behavior change. It may be that increasing self-efficacy for finding and creating supportive environments may be a particularly effective strategy for promoting the maintenance of regular PA because it may require less self-regulatory effort over time to perform a behavior in an environment that supports the behavior than it does to cope with barriers in an unsupportive environments.

### Future Research Directions ...

Although the intervention was successful in building the environmental change efficacy of youth and their physical activity, the intervention did not influence fruit and vegetable consumption. Because the intervention site coordinators and youth leaders were facing a constant battle of competing demands by attempting to promote two behaviors in two places (school lunch and after school programs), future studies implementing the Healthy Youth Places process may have greater effects if there is a focus on developing the social and physical of one healthy place at a time (either after school programs or school lunch).

### ***Institution ...***

*Oregon Health & Science University*

### ***Project Name ...***

*PHLAME: Promoting Healthy Lifestyles Alternative Models' Effects*

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### ***Background / Significance of Problem***

Compelling evidence indicates the benefits of regular physical activity, diets low in fat and high in fruits and vegetables, and maintenance of a healthy body weight. However, most Americans do not adhere to these recommendations. PHLAME's lifestyle objectives reflect those four behaviors, and the study compares a testing-plus-results-only control group and two worksite health promotion strategies: 1) a team-centered peer-taught scripted curriculum; and 2) one-on-one meetings with a trained counselor using motivational interviewing (MI) techniques. PHLAME's team-centered curriculum uses principles of adult learning and is grounded in social learning theory, with one's actions being influenced by 'external' observations, vicarious experiences and peers. MI is a client-centered communication strategy, which facilitates defining one's 'internal' motivation for change by resolving ambivalence and choosing means to actualize personal goals. PHLAME's subjects are professional fire fighters. Despite their work demands, they have a high prevalence of sedentary lifestyles, obesity, hypertension, dyslipidemia and certain malignancies, and their work structure is a natural setting for a team-centered program.

### ***Research Question***

Our primary outcome measures for the prospective head-to-head comparison reflect PHLAME's four health promotion goals, potential mediating variables, stage of change and secondary consequences of those actions, e.g., lipid levels and blood pressure. Newer statistical methods, such as hierarchical linear and latent growth modeling, are being used to validate hypothesized model structure, identify relationships and sequences among variables/mediators. The process assessments allows distinguishing effects of the interventions and their implementation.

### ***Findings To-Date***

Our research group's recent activities have involved completing testing and applying for funding to continue to follow our subjects, assess the team-centered curriculum in other geographically dispersed fire departments and better understand MI for health promotion. Year Two data (T3) are now being cleaned and entered. We have an impression that control fire fighters did not further improve and gains continued in the two intervention groups, with MI 'catching up' with the team condition. Those are speculations only. The randomization resulted in three similar groups, and year one attrition also was comparable among the three conditions, with approximately 83% returning for the second test. The T1-T2 analyses are primarily exploratory, looking for differential treatment condition effects. Constructs, survey items and physiological measures have been subject to MANOVA, autoregressive generalized estimating equations (GEE) and repeated measures GEE.

Preliminary conclusions are that the 'control' condition (testing and learning their results) was associated with more regular physical activity and healthier eating habits. Despite that, both interventions achieved significant gains in all knowledge domains and improved eating and physical activity habits. In general, the team condition outperformed the MI group, with greater changes in outcome measures and presumed mediating constructs of team task-specific cohesion. Currently, we are examining the Year One (T2) data after incorporating 'dosage' measures, which for the team group, requires identifying issues concerning both attendance/fidelity for team sessions and time spent working with their assigned team. In addition, as a step toward profiling those who benefit most from an intervention, we added predictors to the GEE autoregressive construct analyses. Results are interesting, e.g., smokers did not do as well with team approach, and the plan is to use a general growth mixture-modeling framework to identify subpopulations who would respond to the specific interventions.

### *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

The process of change appears to vary with intervention format. The team strategy is a relatively novel approach for altering adults' health behaviors, and our findings indicate it may enlist influences not available to individual format and provide a feasible, acceptable and effective means for health promotion. The team's 'one-size fits all' approach does not incorporate the transtheoretic model, and subsequent analyses are needed to define implications of participant variability. Our population and their work setting are unique. Characteristics of the team, such as task specific cohesion, appear to affect outcome. Similar curricula could be adapted for other settings, augmented with team-building activities and assessed for their effects. The individual and 'team' characteristics relating to study outcomes, once identified, might allow appropriate application or sequencing of strategies for individuals and different population subgroups. Although the one-on-one strategy may seem more 'clinically' applicable, counseling using Motivational Interviewing (MI) for health promotion is a departure from the current norm, and its success depends on clearly documenting its efficacy, identify individuals who will benefit from its use and define characteristics of effective MI.

### *Future Research Directions ...*

In addition to the analyses mentioned with our findings, we have submitted proposals to continue to follow these subjects for durability of change, dissemination of the curriculum and analyses of Motivational Interviewing (MI) interactions. Because their mediation differs, combining team and MI may have additive or even synergistic effects. We also have applied to evaluate 1) team curriculum, 2) individual MI plus team, 3) blended MI leading team and 4) testing and results only control group. Finally, MI for health promotion remains a 'black box,' and we are interested in combining our individual outcomes data with the more than 400 hours of taped MI interactions that we have cataloged to define critical MI behaviors and for whom and under what conditions is MI most effective.

### *Suggested Cross-Site Activities ...*

Our study methodology benefited from workgroup discussion, and we have shared data with the Nutrition, MI and Physical Activity workgroups and look forward to seeing those outcomes. We would like to continue those work groups. For our MI proposal, we recognized that our subjects represented a restricted demographic group, and Dr. Peterson (HSPH) collaborated on the proposal, as her study subjects are demographically different and potentially complementary to PHLAME participants. Our recent proposals have quantitative and qualitative components. Although we have expert local consultants for the later, we would be interested in cross-site activities concerning application of qualitative methods to the study of health promotion.

### *Institution ...*

*Oregon Research Institute*

### *Project Name ...*

*Mediterranean Lifestyle Program*

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### *Background / Significance of Problem*

Coronary heart disease (CHD) is the leading cause of death and functional limitations among women in the U.S. Postmenopausal women with diabetes are at especially high risk of CHD, but CHD research with this population is very limited. Epidemiological and clinical studies suggest that diabetes is associated with increased risk for CHD that is greater in women than in men. CHD is a major cause of death and functional limitations in women, but the vast majority of CHD studies have primarily involved middle-aged men. There is convincing research evidence that healthy lifestyle behaviors, including low-fat diet, physical activity, stress management, smoking cessation, and social support, can reduce CHD risk.

### *Research Question*

The overall goal of this project was to test a practical, theory-based intervention to achieve long-term behavior change for women with type 2 diabetes at high risk for developing coronary heart disease (CHD). We conducted a randomized trial to compare short-term (6-month) outcomes in women receiving usual care compared to a modified Ornish-type comprehensive lifestyle management (CLM) intervention. After 6 months, women in the CLM condition were randomized to one of two approaches for providing support – either lay-led group support or personalized computer-based support – to evaluate these strategies in enhancing longer-term maintenance of effects. Outcomes included multiple CHD lifestyle behaviors (e.g., dietary intake, exercise levels, stress management, smoking cessation), physiological risk factors associated with CHD (e.g., serum lipids, hypertension, weight, vascular reactivity), HbA1c, and quality of life (e.g., depression, functioning).

### *Findings To-Date*

- [•] **BEHAVIORAL OUTCOMES:** In intent-to-treat analyses, Mediterranean Lifestyle Program (MLP) participants showed significantly greater improvement in dietary behaviors, physical activity, stress management, at 6-, and 12- months compared to a usual care (UC) control condition. Physiological outcomes. Multivariate analyses of covariance revealed significantly greater improvements in the MLP condition compared to the usual care group on hemoglobin A1c, body mass index, plasma fatty acids, and quality of life at 6-month follow-up.
- [•] **PSYCHOSOCIAL OUTCOMES:** At the 6- and 12-month assessments, MLP participants made significantly greater improvements than UC participants on measures of diet behavior self-efficacy,

exercise behavior self-efficacy, and confidence in overcoming challenges to illness management. Those treatment effects are important because self-efficacy has a significant influence on self-management and clinical outcomes, even after controlling for the strong predictive effect of past levels of self-care. Clinical depression occurs in 15-20% of people with type 2 diabetes, and interferes with adequate self-treatment and glycemic control. While we did not specifically intervene on depression and did not select a clinically depressed sample to study, the MLP condition showed decreases and the UC condition showed increases in depression, and the between-group difference in depression was marginally significant ( $p=.053$ ) at 6-month follow-up. Social resources. Compared to UC, MLP participants reported significant improvements in social support following the first 6 months of intervention. This effect was maintained at 12 months. Those improvements included increases in the amount of perceived emotional and tangible support, and increases in support from friends and family members. Our measure of personal, social, and community resource use, the Chronic Illness Resources Survey, also showed a significant treatment effect at the 6- and 12-month assessments. We conducted analyses to determine if the MLP intervention was differentially effective for women who varied on education, income, employment status, comorbid illness, and several indicators of pretreatment levels of social support. Results showed no indication that the effects of the MLP intervention on diet, exercise, or stress management were affected by a large number of background characteristics.

## *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- [•] The next step in this research is to investigate the poorly understood natural history of long-term maintenance of change in multiple behaviors (i.e., dietary, physical activity, and stress management) related to CHD risk, as well as the effects of theoretically important mediating variables on relapse and maintenance. This research could rely on a framework that synthesizes social-cognitive, social-ecologic, and goal-systems theories. It should also provide important scientific and theoretical information about the patterns of maintenance/relapse among multiple risk factors, and about the relative importance of theoretical mediating variables (self-efficacy; problem-solving; peer and community support). This natural history of maintenance may be examined using a variety of statistical approaches, including mediational and latent growth modeling techniques.
- [•] In addition, the potential for translating this program into the real world could be assessed using the RE-AIM evaluation framework, a cost-effectiveness analysis should be conducted, and, if the approach is cost effective, it should be disseminated.

## **Institution ...**

*Stanford University School of Medicine*

## **Project Name ...**

*Exercise Advice by Human vs. Computer: Testing 2 theories*

## **Principal Investigator ...**

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## **Background / Significance of Problem**

Expanding the reach of successful behavioral interventions to increase regular physical activity represents an important public health challenge, as well as an opportunity to evaluate the predictive ability of two different theories of motivation: Social Influence Theory and Self-determination Theory.

## **Research Question**

The current study compared telephone counseling delivered by humans (social influence enhancement) vs. automated technology (self-determination enhancement). We randomized 218 sedentary, healthy men and women aged 55 years and older (mean = 60.6 ±5.5 years) to a telephone-based physical activity counseling program delivered by health educators, the same program delivered by a computerized, automated telephone counseling system, or an attention-control (health education) program. The major outcome was weekly minutes spent in moderate or more vigorous (MOD+) physical activities, measured by the Stanford 7-Day Physical Activity Recall and validated via accelerometry.

## **Findings To-Date**

- [•] During the 6-month adoption phase, participants in both the health educator-delivered and automated telephone counseling programs significantly increased their physical activity above the 150 minutes/week recommended by the current national guidelines, while participants in the control arm remained under-active (baseline-adjusted mean minutes spent in MOD+ activities = 169, 174, and 103 minutes/week, respectively,  $p < .02$ ), with no differences between the two intervention arms.
- [•] Preliminary 12-month results indicate that participants in the two intervention arms maintained these levels of activity.
- [•] Exercise-specific self-efficacy (confidence) and other motivational processes increased significantly and similarly in the 2 intervention arms relative to controls ( $p$  values  $< .02$ ).
- [•] Application of signal detection analysis in the exploration of baseline moderators of 6-mo. intervention effects support the theory-based predictions for the project stemming from social influence and self-determination approaches.

## *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- ] The results underscore the utility of automated telephone counseling systems for physical activity as an efficacious and potentially lower-cost alternative to human counseling.
- ] They also provide initial information related to which subgroups of individuals might be particularly successful with computer vs. (human counselor).

## *Future Research Directions ...*

We will evaluate the sustained effectiveness of each program through 18 months, as well as undertaking cost-effectiveness analyses. We will also continue to explore the potential matching of empirically derived subgroups to the two types of intervention approaches.

### **Institution ...**

*University of Maryland*

### **Project Name ...**

*Testing the Effectiveness of the Exercise Plus Program*

### **Principal Investigator ...**

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### **Background / Significance of Problem**

Hip fracture is a major public health problem with striking consequences for the older adult, his or her family, and the health care system. By the year 2040, over 650,000 hip fractures will occur annually in older adults over the age of 65. Recovery following a hip fracture has been shown to be greatly facilitated by participation in a rehabilitation program, and continued participation in a regular exercise program can improve functional recovery, muscle strength, and prevent future fractures. Despite the benefits of exercise, it is difficult to get older adults to initiate exercise activity, and helping them adhere to an exercise regime is even more challenging. It is essential to find ways to increase exercise activity in older adults. Self-efficacy, a belief in the individual's capabilities to perform a course of action to attain a desired outcome, and outcome expectancy, the belief that carrying out behavior will lead to a desired outcome, are hypothesized to be critical factors in adhering to a regular exercise program. The primary aims of this study are to implement a home delivered self-efficacy based intervention to strengthen efficacy expectations (self-efficacy and outcome expectations) related to exercise, decrease perceived barriers to exercise, and improve exercise behavior and overall activity of older adults who have sustained a hip fracture. The secondary aims focus on the anticipated benefits that are expected to occur when older adults exercise regularly.

### **Research Question**

The primary aims of this study are to: 1) Test the effectiveness of the Exercise Trainer component of the intervention (i.e. regular home visits from an exercise trainer) on exercise behavior, activity, and efficacy expectations (self-efficacy and outcome expectancy) related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 1); 2) Test the effectiveness of the Plus component of the intervention (i.e. motivational intervention provided at home) on exercise behavior, activity, and efficacy expectations related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 2); 3) Determine if the Exercise Trainer component is enhanced by the Plus component (i.e., the Exercise Plus Program) with regard to exercise behavior, activity, and efficacy expectations related to exercise at 2, 6, and 12 months following a hip fracture (hypothesis 3).

### **Findings To-Date**

- At this point in time a total of 151 participants have been enrolled in the study. The majority of these individuals are Caucasian and the average age is 82. Preliminary findings show some positive trends in terms of the effectiveness of the Exercise Plus Program on improving adherence to exercise. Participants exposed to any of the treatment groups reported more time exercising and engaging in physical activity, less fear of falling at 6 months, better

function at 2 months for those in the exercise only and exercise plus groups, and better function at 6 months for those in the Exercise only and Plus only groups. Participants in treatment groups were more likely to report that they intended to initiate an exercise program in either the next 30 days or the next 6 months.

### *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- [•] These findings provide some support for both theories used in the development of the interventions. In addition, although results are preliminary there is some support to suggest for ongoing monitoring of outcomes to establish if these benefits will last over time. In addition, it is possible that inoculation treatments may be needed to not only help those who are exercising to continue to do so, but to help those who report an intention to exercise to actually initiate exercise.

### *Future Research Directions ...*

Future research will focus on monitoring the impact of the Exercise Plus Program over time. In addition, qualitative work throughout the course of the study has helped to identify areas in which the intervention could be improved to better facilitate behavior change. Moreover, specific issues related to behavior change among older adults (i.e. cognitive issues and physical problems such as sensory changes) were noted and the interventions may need to be adjusted to better meet the needs of individuals with these specific impairments.

## **Institution ...**

*University of Michigan*

## **Project Name ...**

*Better Health (Tailored Interventions for Multiple Behaviors)*

## **Principal Investigator ...**

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## **Background / Significance of Problem**

The University of Michigan's Health Media Research Laboratory, in collaboration with Henry Ford Health System, is evaluating the impact of a longitudinal computer-based tailored print intervention and complementary web-based tailored telecounseling intervention among roughly 3,000 HMO enrollees.

## **Research Question**

Through a randomized, 2x2 factorial trial, we are determining effectiveness of the interventions, both individually and in combination, in achieving behavior change in three targeted health risk behaviors: low vegetable consumption, cigarette smoking, and sedentary behavior. Three- and twelve-month behavioral effects of the individual and combined treatments are being evaluated. Features of the project include: (1) use of multiple eHealth strategies, including the web, computer-tailored print, and the electronic medical record; (2) interaction of eHealth tools with a trained health specialist; and (3) implementation in a realistic, generalizable setting.

## **Findings To-Date**

Current follow-up data provide sufficient power to examine intervention effects on vegetable consumption. Tailored print materials resulted in a .41 serving improvement in vegetable consumption three months after baseline assessment versus a .08 serving improvement among those not receiving tailored print ( $p=.02$ ). This difference was greater among African American subjects (.61 versus -.16 serving improvement;  $p=.02$ ).

## **Implications**

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

At this stage of the trial, the tailored print material intervention is demonstrating a significant effect on vegetable consumption. We have not found this effect in the telecounseling intervention, which has not demonstrated a significantly effect on vegetable consumption, nor have we found a synergistic effect of both tailored print materials and telecounseling. Results to date suggest that an inexpensive, high-reach program can be effective in enhancing vegetable consumption if it is tailored to the specific needs and interests of the user.

### *Future Research Directions ...*

Tailored programs should be further tested on the World Wide Web – a far less expensive alternative to tailored print materials. These programs should also be examined for their effectiveness in maintaining long-term behavioral change.

### *Suggested Cross-Site Activities ...*

It would be interesting to test these tailored print materials as tools in other intervention strategies (e.g., community-based, clinic-based).

### *Institution ...*

*University of Minnesota*

### *Project Name ...*

*Challenge Project*

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### *Background / Significance of Problem / Research Question*

The benefits afforded by reductions in unhealthy behavioral practices and increases in health behavioral practices are almost always contingent on those practices being sustained over time. Thus, successfully adopting a healthy pattern of behavior (e.g., not smoking) is not sufficient. The new pattern of behavior must be maintained over time. Intervention methods that have been shown to help people successfully change their behavior have not produced similar effects on longer-term outcomes (e.g., Jefery et al., 2000). Innovations in the design and implementation of interventions are needed that will help people not only to initiate a change in their behavior but also to maintain that change over time. Current models of behavioral decision-making offer limited guidance as to factors that might differentiate between decisions to initiate and to maintain a new pattern of behavior.

We have proposed that decisions regarding behavioral initiation and behavioral maintenance reflect different decision criteria. Specifically, the decision to initiate a new change in behavior is a function of people's expectations of the processes and outcomes associated with the new behavior; people will take action only if they believe that the new behavior will afford a set of experiences that are meaningfully better than those afforded by their current pattern of behavior. Decisions regarding whether to maintain a behavior are predicted to rest on people's satisfaction with the outcomes afforded by the new pattern of behavior. Moreover, people's feelings of satisfaction are predicted to be contingent on the degree to which their experiences meet their expectations. This thesis suggests that optimistic expectations regarding the outcomes afforded by a new pattern of behavior may motivate people to initiate a change in behavior but undermine their desire to maintain that behavior over time (for a more complete discussion, see Rothman, 2000).

To test this new model, a series of four intervention studies were conducted. Two were targeted at smoking cessation and two were targeted at weight loss. Studies 1 (smoking cessation) and 2 (weight loss) were designed to test the impact of people's expectations about behavior change on initial and long-term behavioral outcomes. Specifically, participants were assigned to either an optimistic expectation or balanced expectation intervention condition. The active intervention lasted 8 weeks and participants were followed for 18 months. We predicted that participants in the optimistic condition would be more likely to initiate but less likely to sustain a change in their behavior than would participants in the

balanced condition. Studies 3 (smoking cessation) and 4 (weight loss) were designed to test the impact of how people evaluate the experiences afforded by changes in their behavior on their satisfaction with those changes. Specifically, participants were assigned to either a future-focused or a past-focused intervention condition. The future-focused intervention taught people to compare their experiences to what they wanted the behavior change to provide, whereas the past-focused intervention taught people to compare their experiences to what their life was like prior to the change in their behavior. We predicted that participants in the past-focused condition would be more satisfied with their experiences and consequently more likely to sustain the change in their behavior over time.

### *Findings To-Date /Future Research Directions*

At present, we are able to report initial findings for Studies 1 and 2. We anticipate data from Studies 3 and 4 to be available for data analysis in the near future. Intervention Study 1: Smoking Cessation. This study was designed to test the hypothesis that optimistic expectations about the process and outcomes associated with behavior change would facilitate behavioral initiation, but undermine people's satisfaction with the new behavior and thus undermine behavioral maintenance. Participants were randomly assigned to either an optimistic or balanced expectations intervention program. The active treatment program lasted for 8 weeks and participants were instructed to quit after the fourth weekly meeting (See King, Rothman, & Jeffery, 2002 for further details). Consistent with study hypotheses, participants in the optimistic expectations condition were more likely to be quit at the end of the active treatment program. However, the impact of treatment condition was moderated by people's prior experience with cessation. Specifically, participants who had at some point in their life experienced some success with cessation (i.e., having been quit for at least 3 months) benefited from assignment to the optimistic treatment program, whereas participants who had never had success with cessation did better when assigned to the balanced treatment program.

The impact of the intervention on initial quit efforts was mediated by participants' expectations about the consequences of cessation and their confidence in their ability to remain smoke-free. Smoking status at the end of the active program predicted status at 18 months. Intervention condition had no impact on participants' satisfaction with the consequences of their behavior (contrary to study hypotheses). However, perceived satisfaction with initial behavior change did prospectively predict behavioral maintenance. Intervention Study 2: Weight Loss. This study was designed to test the same set of hypotheses that were examined in Study 1 but operationalized in regards to weight loss. Once again, participants were randomly assigned to either an optimistic or balanced expectations intervention program. The active treatment program was designed such that the structure paralleled that used in Study 1. Thus, it lasted for 8 weeks and participants were instructed to begin efforts to lose weight only after the fourth weekly meeting. Although the direct effect of the intervention condition on weight loss (both short- and long-term) was not significant, the intervention condition did alter people's expectations about weight loss, which, in turn, predicted weight loss. Specifically, people in the optimistic intervention condition formed more positive expectations about weight loss and these expectations prospectively predicted weight loss. Similar to Study 1, intervention condition did not alter participants' satisfaction with the consequences of their behavior. However, once again, perceived satisfaction with outcomes afforded by initial weight loss did prospectively predict long-term weight control.

### ***Institution ...***

*University of Rhode Island*

### ***Project Name ...***

*The SENIOR Project*

### ***Principal Investigator ...***

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### ***Background / Significance of Problem***

The aging of the U.S. population poses unprecedented public health challenges to our society, particularly in the field of health promotion. The projected impact of the large cohort of baby boomers on health care services and costs is anticipated to be great. The success of public health interventions in postponing the onset of chronic illness and in providing effective management of existing disease and disability promises to have a positive impact on the quality of life of this rapidly expanding population group and potentially also on reducing Medicare costs in the future. In particular, recent attention has been focused on the importance of both increased exercise levels and improved diet for enhanced quality of life in older adults. In addition, calls have recently been made for the development of interventions that combine the reach of a public health model with the personalization of an individualized assessment and intervention individualization combined with large-scale reach. Research examining multiple behavior interventions is especially important to assess potential interactions between the interventions, e.g., overburdening, enhancement, and additivity that deal with questions of effectiveness and efficiency.

### ***Research Question***

The primary purpose of the SENIOR project is to investigate the relative effectiveness of a Transtheoretical Model (TTM)-based multiple behavior intervention (exercise and nutrition) compared to single-behavior interventions. This study is a 2x2 experimental design with the following groups: 1) exercise intervention only; 2) nutrition intervention focusing on fruits and vegetables (F&V) only; 3) combined exercise and nutrition; and 4) a control group receiving fall prevention materials. The secondary purposes are: 1) to investigate the interventions' effects on both functional ability and general health outcomes; and 2) to investigate how older adults move along a continuum of changing their health-related behaviors.

### ***Findings To-Date***

- [•] Data collection points for the SENIOR Project were scheduled for baseline, 12, and 24 months. Baseline and 12-month data only have been partially analyzed. At baseline the average age of SENIOR Project participants (N=1,277) was 75.7 years. Data were analyzed to examine the relationships among the stage of change for exercise and F&V consumption with regard to participant stages of readiness to change and the characteristics of participants at different levels of readiness to change their exercise and/or nutritional behaviors.

The two stage of change measures were significantly associated, i.e., individuals in action/maintenance for one behavior were more likely to also be in action/maintenance for the other behavior – however, the association was small. Overall, stage of change for fruit and vegetable consumption was associated with the dietary measures and energy expenditure, but not with the activity summary score or the Up-and-Go time; and stage of change for exercise was associated with the three physical activity measures and servings of fruit per day, but not with servings of vegetables/day or estimated percent of daily calories of fat.

- ] These analyses suggest that individual older adults' readiness to change is behavior-specific. A total of about 950 project participants provided data for the 12-month assessment. The proportion of the sample in the action and maintenance stages at baseline did not differ on either behavior. At 12 months, the group receiving the exercise only intervention had a significantly higher proportion in action/maintenance than any of the other groups, and only this group showed a significant increase over baseline. For diet, all groups increased compared to baseline and none of the groups differed significantly at 12 months, except that the exercise only group resulted in significantly less action/maintenance for F&V consumption.

### *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- ] Baseline data analyses suggest that individual older adults' readiness to change is behavior-specific. At 12 months, results appear to suggest that although the exercise intervention did increase physical activity, it may also have decreased fruit and vegetable consumption. While these results are quite preliminary, this finding would represent the first time that a stage-tailored intervention for one behavior has had a negative impact on another behavior.
- ] Since we have not seen this result with other samples receiving multiple behavior interventions, our present working hypothesis is that this may be a sample-based result. However, this interpretation is not entirely clear, because a comparison of groups that received the diet intervention, against those that did not, shows a marginal increase in fruit and vegetable consumption for the combined diet groups. Since TTM-tailored interventions have invariably shown increases in the proportion in action/maintenance even 12 to 24 months after the end of interventions, we feel it is important to interpret these results as very tentative at best.

### *Future Research Directions ...*

The SENIOR Project has applied for the RFA OB-03-003 on "Maintenance of Long Term Behavioral Change," to allow us to follow the project sample for four more years, for a total of seven years from the initial baseline assessment, focusing on factors related to the maintenance of exercise and dietary behaviors. We will continue to seek funding to enable us to refine the intervention in terms of effectiveness and cost, and to improve its reach to a larger, community-based sample in Rhode Island.

### **Institution ...**

*University of Rochester*

### **Project Name ...**

*Self-determination, Smoking and Diet*

### **Principal Investigator ...**

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### **Background / Significance of Problem**

Tobacco use and diet related to cholesterol contribute to over 700,000 premature deaths in the U.S. each year. Public Health Service Guidelines for Treatment of Tobacco Dependence assert that autonomy and its support is needed for effective treatment. However, autonomy has never been demonstrated to predict this change. Self-determination theorists hypothesize that perceived autonomy and perceived competence motivate abstinence from tobacco and adhering to diet to improve cholesterol. Because the diet outcomes are not yet available, this report will focus only on tobacco outcomes. This was a cessation induction trial (includes smokers whether they want to quit or not), in which participants were randomized to individual intensive treatment (based on SDT) or community care.

### **Research Question**

To link theoretical constructs of motivation (autonomy, competence, and autonomy support) to tobacco dependence treatment outcomes such as cotinine validated 7-day point prevalence at 6 months.

### **Findings To-Date**

- [•] Intention to treat analyses indicate the SDT intervention resulted in 11.8% six-month cotinine validated cessation versus 4.1% in community care ( $p < .001$ ). Those receiving the SDT intervention had significantly greater increases in autonomy and perceived competence from baseline to 1 month ( $p$ 's  $< .01$ ). In addition, participants receiving the SDT intervention perceived greater autonomy support than those in the community care condition ( $p < .001$ ).
- [•] At 6 months, more patients reported having taken medication for cessation (31% vs. 16%,  $p < .001$ ) in the intervention. Of the 52% of patients not intending to quit at baseline, significantly more made a serious quit attempt (47% vs. 32%), used medications to quit (30% vs. 10%), and were abstinent at 6 months (9.8% vs. 3.7%), all differences significant at  $p < .05$ . Furthermore, autonomy support ( $p < .001$ ), change in autonomy ( $p < .05$ ), change in perceived competence ( $p < .001$ ), and the use of medications ( $p < .01$ ) all predicted 6-month cotinine validated cessation.

## *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- These findings confirm that autonomy, competence, and autonomy supportiveness are important predictors of cessation from a self-determination theory based intensive intervention for tobacco dependence. This confirms their importance for the PHS guidelines.
- Motivation for cessation, use of medications, serious quit attempts, and long-term abstinence were all significantly increased compared to smokers treated in the community. This was true whether the participants intended to quit smoking or not at the start of the trial. These findings have implications for extending tobacco interventions for all smokers, and suggests that the use of medications can be increased through autonomy supportive counseling about health benefits of cessation, and medication risks and benefits.

## *Future Research Directions ...*

Future directions include using SDT constructs and clinical interventions to increase long-term adherence to lifestyle change and medication taking to improve a broad range of health care outcomes. These could include cardiovascular disease, cancers, diabetes, immunizations, and a variety of health related behaviors (wearing seat belts, using sun screen, flossing one's teeth, using condoms, etc.).

### *Institution ...*

*University of Tennessee, Memphis*

### *Project Name ...*

*Health Opportunities with Physical Exercise (HOPE)*

### *Principal Investigator ...*

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### *Background / Significance of Problem*

There has been an extensive accumulation of evidence that supports the premise that sedentary lifestyles are a primary cause of cardiovascular disease, cancer at certain important sites, and numerous other morbidities. Despite a high level of public knowl

### *Research Question*

The HOPE trial was designed to intentionally enroll mostly African American women with low incomes. It was designed to compare two theoretical models, which emphasize the importance of social influence in prompting behavior change. Social support theory and patient-provider communication theory were tested as viable models of socially oriented physical activity change based on tenets of Social Action Theory (SAT) and Social Cognitive Theory. The HOPE intervention introduced social interaction processes to a novel environmental context to increase physical activity levels in previously sedentary, overweight persons. SAT posits that such social and environmental factors are necessary for behavior change.

### *Findings To-Date*

- [•] Initial planning and final protocol development were completed prior to the opening of the Hope and Healing Center in January 2000. A total of 361 sedentary patients were screened and randomized to one of the three conditions during the next 15 months and

### *Implications*

*[ for multibehavioral and multi-theoretical approaches to behavior change ]*

- [•] This program was facility based and monitored by a phone/mail/face contact intervention format and delivered either by a peer mentor or a health provider. The preliminary results of HOPE trial suggest that for participants enrolled in a supportive physical activity program, to include regular participant contact, it is possible to increase physical activity levels in sedentary, overweight persons who begin exercising and moving. Further, it is possible to achieve change after one year of intervention in workplace activities that is greater than that of standard care intervention. Recall of occupational activity has been found to be valid and reliable.

- [•] Based on the findings cited above, the social networking and supportive aspects of the peer mentor intervention model is likely to have more lasting effects, and is likely to be more feasible as a low cost alternative to professional advice.

### *Future Research Directions ...*

Follow-up of participants in exercise intervention trials has rarely exceeded one year. Strictly defined, the maintenance period usually begins when all intervention (phone contacts, mailed materials, etc.) ceases. However, a low cost extended intervention would seem to be a natural adjunct to an intervention phase that is often short duration (up to one year) and relatively expensive. Thus, future efforts will define two maintenance phases. Phase I, where low cost, infrequent (no more than one per month) phone and mail contacts are made followed by Phase II maintenance, where the only contact is to ascertain fitness and physical activity status.