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Healthy Body/Healthy Spirit: a church-based nutrition and physical activity intervention

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Abstract

African-Americans (AAs) are significantly less likely to be physically active than other Americans, and, like all Americans, they consume fewer than the recommended five fruit and vegetable (F & V) servings per day. This study, titled Healthy Body/Healthy Spirit, has two primary aims: (1) to test the effectiveness of a culturally tailored self-help dietary (focusing on F & V intake) and physical activity (PA) intervention compared to standard health education materials, and (2) to test the effectiveness of using Motivational Interviewing (MI), delivered by telephone, to modify PA and dietary habits. The study is a randomized effectiveness trial with three experimental conditions. Group 1 (comparison) will receive standard (existing commercial) nutrition and PA intervention materials, Group 2 (TX1) will receive a culturally tailored self-help nutrition and PA intervention of similar intensity as Group 1, and Group 3 (TX2) will receive the same intervention as Group 2, plus four telephone counseling calls based on MI. Participants will be AA adults recruited through local black churches. Despite the extensive use of MI to modify addictive behaviors, this represents one of the first controlled field trials to employ MI to address diet and PA. Secondly, this is one of the first studies to test the effectiveness of a self-help diet and PA intervention tailored for an African-American church population.

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Brief rationale

Poor dietary patterns and sedentary lifestyle together account for between 300 000 and 500 000 deaths each year, ranking second only to tobacco use as causes of preventable deaths (McGinnis and Foege, 1993). Diets high in fat and low in fiber are associated with higher death rates of coronary heart disease (CHD), colon, breast and other cancers, stroke, and diabetes (National Research Council, 1989; US Department of Health and Human Services, 1991), whereas high fruit and vegetable (F & V) intake has been shown to be protective for certain cancers, stroke, CHD and age-related blindness (Gillman *et al.*, 1995; Sahyoun *et al.*, 1996; Steinmetz and Potter, 1996; Witte *et al.*, 1996; Ness and Powles, 1997; Wargovich, 1997). Likewise, a sedentary lifestyle has been associated with higher mortality rates due to CHD, stroke, colon cancer and diabetes (Blair *et al.*, 1995; Pate *et al.*, 1995; US Department of Health and Human Services, 1996). Increasing the proportion of Americans who consume at least five servings of F & V per day as well as the proportion who engage in moderate to vigorous physical activity (PA) for 30 min most days of the week are national health priorities (Havas *et al.*, 1995; US Department of Health and Human Services, 2000).

Like most Americans, African-Americans (AAs) on average consume fewer than the recommended five F & V servings per day (Foerster *et al.*, 1995; Krebs-Smith *et al.*, 1995; Serdula *et al.*, 1995; Potter *et al.*, 2000; Resnicow *et al.*, 2000a).

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Whereas there does not appear to be significant differences in mean daily intake between blacks and whites (Patterson *et al.*, 1990; Swanson *et al.*, 1993; Foerster *et al.*, 1995; Krebs-Smith *et al.*, 1995; Serdula *et al.*, 1995; Potter *et al.*, 2000), considerable ethnic and geographic differences regarding which F & V are consumed and how they are prepared are evident (Patterson and Block, 1988; Borrud *et al.*, 1989; Coates *et al.*, 1991; Swanson *et al.*, 1993; Patterson *et al.*, 1995; Serdula *et al.*, 1995).

Regarding PA, AAs (both male and female) are more likely to have a sedentary lifestyle than whites and AA women (Crespo *et al.*, 2000) are considerably more likely than white women to be overweight (Centers for Disease Control and Prevention, 1994). These differences appear to be independent of socioeconomic status (Troiano and Flegal, 1998; Crespo *et al.*, 2000).

The church represents a potentially effective channel for delivering health programs to AAs. Many black churches include health as part of their overall mission, offering health services and programs through special committees and ministries (Thomas *et al.*, 1994; Lasater *et al.*, 1997; US Department of Health and Human Services and National Institutes of Health, 1989). Given the potential ease of participant recruitment and tracking, churches also represent an excellent research setting. Several health promotion studies have been successfully conducted in churches, including some that have addressed dietary behavior (US Department of Health and Human Services and National Institutes of Health, 1989; Wiist and Flack, 1990; Hatch and Voorhorst, 1992; Kumanyika and Charleston, 1992; Stillman *et al.*, 1993; Lasater *et al.*, 1997) and more specifically F & V intake (Campbell *et al.*, 1999; Resnicow *et al.*, 2001b). Another advantage of working in black churches is access to middle and upper socioeconomic AAs, a group often under-represented in health promotion studies.

Purpose—primary aims

The study utilizes a three group, cluster-randomized design, with churches, rather than individuals, assigned to treatment condition. Prior to randomization, churches were matched in triplicates, stratified by income and size. Group 1 (Comparison) will receive standard PA and nutrition education materials; Group 2 will receive a multi-component intervention package that includes culturally tailored nutrition and PA materials. As shown in Table I, the intervention includes a video addressing F & V intake, a video addressing PA, a gospel-based audio walking tape, a cookbook and a PA guide. These materials incorporate spiritual/religious messages and biblical scripture, e.g. 'God delights in every step you take' to motivate positive behavior change. Group 3 will receive the same intervention as Group 2, plus four telephone counseling calls based on Motivational Interviewing (MI).

The three-group design will enable us to examine two primary research questions:

(1) What is the effectiveness of a culturally tailored self-help diet and PA intervention versus standard health education materials not tailored for an AA church population?
(2) What is the effectiveness of four MI telephone counseling calls for increasing F & V intake and PA in an AA population recruited through black churches?

Evaluation design

There will be two data collection points: baseline and 1-year follow-up. Most data (with the exception of 24-h recalls which will be collected by phone) will be collected at health fairs. Recruitment and retention of participants will be enhanced with incentives, such as a $10.00 per person donation to each church, that have been successful in our prior church-based studies (Resnicow *et al.*, 1997, 2000a). In addition, all intervention and comparison participants will be contacted by telephone and mail to encourage attendance at the 1-year follow-up health fair.

Population

Participants will be AA adults 18–72 years of age (willing to provide a mailing address and home

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Table I. *Intervention overview*

Group 1 (n = 5 churches): standard health education materials	Group 2 (n = 6 churches): multicomponent intervention	Group 3 (n = 5 churches): multicomponent intervention with four MI calls
1. Biomedical screening and feedback	1. Biomedical screening and feedback	1. Biomedical screening and feedback
2. Standard exercise video	2. *Forgotten Miracles* video	2. *Forgotten Miracles* video
3. Standard cookbook	3. *Eat For Life* cookbook	3. *Eat For Life* cookbook
4. Standard F & V pamphlets	4. Healthy Body/Healthy Spirit exercise video	4. Healthy Body/Healthy Spirit exercise video
5. Standard exercise pamphlets	5. Healthy Body/Healthy Spirit activity guide	5. Healthy Body/Healthy Spirit activity guide
	6. Project newsletter	6. Project newsletter
	7. 'Walking with God' audio tape	7. 'Walking with God' audio tape
	8. Pedometer	8. Pedometer
		9. Four MI calls (weeks 2, 12, 24 and 40)

telephone number) recruited from 16 Atlanta area predominantly black churches. Participants will be recruited at health fairs, usually conducted after Sunday services, as well as by project liaisons, who will receive incentives for their church based on the number of participants recruited. Based upon our previous church-based studies as well as the initial sample recruited to date, we anticipate that the final sample will be approximately 70% female.

Variables of interest

The primary endpoints for the study will be servings of F & V (assessed by food frequency) and minutes of moderate to vigorous PA per day. These endpoints will be assessed in all participants. Secondary endpoints for the study include serum carotenoids (assessed in a 50% subsample), aerobic capacity (assessed by sub-maximal treadmill test in a 10% subsample), blood pressure levels, body mass index (assessed in all participants with health fair data) and macronutrients (assessed by 24-h recall in a 30% subsample), plus other health habits such as food preparation, shopping and restaurant habits (assessed in all participants with the baseline and post-test questionnaire). All study outcomes will be assessed at baseline and 1-year follow-up.

Outcome analyses

Repeated measures analysis of variance will be the primary statistical model, adjusting for intracluster correlation. Analyses will include factors for group (three levels, comparison = 0, TX1 = 1 and TX2 = 2), the within-subjects repeated measures factor of time (two levels, baseline and 1-year follow-up) and the group×time interaction. The study employs a nested cohort design, with churches, rather than individuals, assigned to condition. To control for cluster randomization effects in outcome analyses, we will utilize SAS/PROC MIXED according to methods recommended by Murray (Murray and Hannan, 1990; Murray and Wolfinger, 1994; Murray, 1998).

Theoretical study question 1: why cultural sensitivity?

The first aim of the study is to test the effectiveness of a culturally tailored self-help intervention compared to standard educational materials (i.e. Group 1 versus 2) (Resnicow *et al.*, 1999, 2000b; 2001a,b). There is consensus that health promotion programs should be culturally sensitive. Yet despite its ubiquity within public health research and practice, there has been surprisingly little

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conceptual work defining cultural sensitivity nor controlled researched testing the effectiveness of culturally sensitive interventions (Marin *et al.*, 1995; Sabogal *et al.*, 1996). Although it is virtually self-evident, at least in a general sense, that health promotion programs should be tailored to the social and cultural characteristics of the target population, what such 'tailoring' entails, how to achieve it and its impact on treatment outcomes has not been adequately examined (Resnicow *et al.*, 1999, 2000b).

Over the past several years, we have developed a multidimensional model of cultural sensitivity that has guided the design of our intervention programs (Resnicow *et al.*, 2000b, 2001a). The two primary dimensions (Resnicow *et al.*, 1999) are *surface structure* and *deep structure*. *Surface structure* involves matching intervention materials and messages to observable social and behavioral characteristics of a target population. For audiovisual materials, surface structure may involve using people, places, language, music, foods, brand names, locations and clothing familiar to, and preferred by, the target audience. Surface structure further includes identifying the channels (e.g. media) and settings (e.g. churches, schools) that are most appropriate for delivering messages and programs. It also entails understanding characteristics of the behavior in question, e.g. the product brands that are used and the context in which health behaviors occur. In sum, surface structure reflects the extent to which interventions correspond to the needs and preferences of the target population; how well interventions *fit* within the culture, experience and behavioral patterns of the audience. In this sense, surface structure is analogous to face validity of psychologic measures, a necessary but insufficient prerequisite for construct validity.

The second dimension of cultural sensitivity, *deep structure*, reflects how cultural, social, psychologic, environmental and historical factors influence health behaviors differently across racial/ethnic populations (Gasch *et al.*, 1991; Airhihenbuwa, 1992; Airhihenbuwa *et al.*, 1992). This includes understanding how members of the target population perceive the cause, course and treatment of illnesses as well as perceptions regarding the determinants of specific health behaviors. Specifically, this involves an appreciation for how religion, family, society, economics and the government, both in perception and in fact, influence the target behavior. Whereas surface structure generally increases the receptivity, comprehension or acceptance of messages (Simons-Morton *et al.*, 1997), deep structure conveys *salience*. Surface structure establishes feasibility, whereas deep structure determines program impact.

Applying the model for this project

In designing the culturally tailored intervention for this project, we employed our formative evaluation framework, described in more detail elsewhere (Resnicow *et al.*, 1999, 2001a) to determine the most acceptable and salient messages for an AA southern population recruited in black churches (Resnicow *et al.*, 1999, 2001b). We began the process by examining the existing literature and other projects that have been conducted in similar populations. We also conducted a series of focus groups (four addressing F & V and four addressing PA) with members of local black churches not participating in this project. As part of the focus group discussion, we employed our ethnic mapping procedure to explore perceived cultural differences regarding which F & V are consumed and which physical activities are performed. This procedure entails sorting behaviors along the continuum presented below.

Mostly a black thing → Equally black and white thing → Mostly a white thing

The process begins by presenting several 'anchors' for which responses have been generally consistent across AA populations. Examples include rap music and Kwanzaa (generally rated mostly black things), skiing and caviar (generally rated mostly white things), and Christmas and television (generally rated equally black and white things). Once participants become comfortable with the classification schema, elements of the

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target behavior are sorted using the same categories. If more than 50% rated the item in one of the three categories, it was considered consensus. For this project, in the F & V focus groups participants were asked to sort approximately 25 foods using this schema. During the PA focus groups, participants sorted approximately 30 types of physical activities. Results of the F & V and PA mapping can be found in Tables II and III.

Our formative research yielded numerous elements for surface structure tailoring including food preferences, cooking practices and exercise patterns unique to this population (Resnicow *et al.*, 2001). Other issues that emerged include unique attitudes regarding body image, concerns among women regarding the effort to redo their hair after exercising, safety concerns in some neighborhoods, and lack of time for exercise due to extensive church and family commitments. Deeper structure issues included the use of scripture and religious themes as well as a focus on improving the health of the larger community (as opposed to the health of individuals) as motivations for behavior change.

Following an iterative process of pre-testing and revision, we developed the following core materials for participants in Groups 2 and 3. Note that the F & V video and cookbook were designed for a prior trial, also conducted in black churches (Resnicow *et al.*, 2000a, 2001b). The process used to develop these materials, however, was similar to that used for the materials designed for this project.

Table II. *Results of ethnic mapping of F & V intake from four focus groups (n = 33)*

Mostly black	Equally black and white		Mostly white
Turnip greens	apples	pears	artichoke
Collards	bananas	peaches	asparagus
Sweet potato pie	grapes	pineapple	beets
Watermelon	oranges	raisins	bean salad
			tomato juice
			pumpkin pie
			apricots

Overview of intervention materials

Forgotten Miracles

Forgotten Miracles is an 18-min video developed for our prior Eat For Life study (which was also conducted in black churches) that uses biblical and spiritual themes to motivate healthy eating (Resnicow *et al.*, 2000a). The story centers around two families who are introduced preparing for church on a Sunday morning. One family exhibits healthy habits (fruit for breakfast); the other family eats candy and soda. During Sunday services, while the pastor lectures on the ‘downfall of the glutton’, the father of the ‘unhealthy’ family nods off and dreams he has a heart attack while eating a large after-church meal. During the remainder of the video, this character transforms his eating patterns to include more F & V. Woven into the story line is information about the health benefits of F & V, analysis of costs, recipes and cooking tips. Key messages are conveyed with biblical themes and passages. For example, the pastor

Table III. *Results of ethnic mapping of PA from four focus groups (n = 29)*

Mostly black	Equally black and white		Mostly white
Basketball	jogging	aerobics at home	aerobics at club
Housework for job	jazz dancing	walking	square dancing
Jump rope/double Dutch	biking	gardening	hiking
	bowling	tennis	squash
	YMCA	swimming at a pool	swimming at a beach
	weights	football	ice skating

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relates the story of Daniel (*Daniel* 1:8–16) who rejects the 'kings diet' high in fat for his 'natural diet' high in F & V. Other biblical messages used include 'whatever you do, whatever you eat, do for the glory of God' and 'your body is God's temple'.

Eat For Life cookbook

The *Eat For Life* cookbook contains recipes submitted by members of local churches. Qualifying recipes were required to contain at least a quarter of a serving of fruit or vegetable per serving and to be low in fat. The cookbook also contains information about the health benefits of F & V, tips for shopping and storing F & V, and cooking techniques.

Healthy Body/Healthy Spirit video

The 20-min video is hosted by well-known AA celebrities in the Atlanta area. One is a local female news anchor, and the other, Lee Haney, is a former Mister Olympia and an owner of several local fitness facilities. Approximately 10 families, recruited from black churches, were provided with a video camera and a designated person, usually an adolescent living in that home, was trained in its use. This person was asked to document the efforts of one of their parents as they attempted to increase or maintain (if they were high at baseline) their activity level over a 4-week period. Participants included both low and high exercisers as well as two pastors. The goal of this 'documentary' component was to provide real-world role models to whom our participants could relate. The documentary footage is linked by narration and instruction from the two hosts. The two pastors were also filmed giving sermons on the importance of exercise and maintaining a healthy body, and clips from their preaching are spliced throughout the video, along with biblical scriptures that relate to health.

Healthy Body/Health Spirit exercise guide

This 37-page, four-color manual was developed to accompany the Healthy Body/Healthy Spirit video. Whereas the video was intended to increase motivation, the written guide contains more background information and instruction. Most of the models shown in the guide also appear in the video, and again biblical themes and scripture are woven throughout. Core messages include: (1) obtain 30 min of PA on most days of the week; and (2) activity of greater intensity and duration will result in added health benefits (Pate *et al.*, 1995; US Department of Health and Human Services, 1996).

The guide provides an activity program for three levels—beginner, intermediate and advanced. The guide emphasizes walking as a core strategy, particularly for those at initially lower levels of activity. To encourage walking, all participants in Groups 2 and 3 are provided with a pedometer (Yamax, Digiwalker) at the beginning of the program (baseline health fair). The guide also addresses other forms of activity, ranging from low to high intensity, as well as strength and flexibility exercises.

Audio cassette

Participants receive an audio cassette containing gospel music. Songs were sequenced so that their tempo matched a three-phase workout: warm up, aerobic activity and cool down. Biblical quotes and brief sound-bites of pastor sermons relating to health are spliced between songs.

Comparison group

There have been few studies to date that have tested the effectiveness of culturally tailored intervention materials holding constant intervention dose and modality. Therefore, to maximize the validity of the comparison between Groups 1 and 2, it was important that these groups differ by the intervention content rather than the format or dose. As indicated in Table I, participants in the comparison group received an intervention of approximately equal intensity and type, i.e. a video, print materials and the health screening. Materials for this group were drawn from government sources and commercial vendors. At the end of the intervention phase, the comparison group will receive the culturally tailored materials.

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Theoretical question 2: why MI?

The second primary aim of this study is to test the effectiveness of telephone-based MI to improve diet and PA behaviors (Group 3 versus Group 2). Originally described by Miller in 1983 (Miller, 1983) and more fully discussed in a seminal text by Miller and Rollnick in 1991 (Miller and Rollnick, 1991), MI has been used extensively in the addiction field (Miller, 1983; Rollnick *et al.*, 1992; Heather *et al.*, 1996; Kadden, 1996). As defined by Miller and Rollnick (Rollnick and Miller, 1995), MI is a:

> client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence.

MI is neither a discrete nor entirely new intervention paradigm, but an amalgam of several principles and techniques, drawn from several models of psychotherapy and behavior change theory. At its core, MI is a method for assisting individuals to work through their ambivalence about behavior change. It appears to be particularly effective for individuals who are initially at low readiness to change (Heather *et al.*, 1996; Butler *et al.*, 1999; Resnicow *et al.*, 2001b).

In recent years, there has been considerable interest on the part of public health and medical professionals in utilizing MI to address other health behaviors and conditions, such as diet, PA, diabetes control, pain management, smoking, screening, sexual behavior and medical adherence (Rakowski *et al.*, 1992, 2002; Stott *et al.*, 1995; Miller, 1996; Smith *et al.*, 1997; Colby *et al.*, 1998; Berg-Smith *et al.*, 1999; Ershoff *et al.*, 1999; Taplin *et al.*, 2000; Velasquez *et al.*, 2000).

The MI counselor tailors the encounter to match the participant's needs, experiences, barriers, fears, readiness and reasons to change. Unlike some psycho-therapeutic models that rely heavily on therapist insight, in MI the client is expected to do much of the psychologic work, subtly guided by the counselor. There is generally no direct attempt to dismantle denial, confront irrational or maladaptive beliefs, or to convince or persuade. Instead, the goal is to help clients verbalize, ponder and reconcile their reasons for and against change and to facilitate the change process. Counselors establish a safe, non-confrontational and supportive climate where clients feel comfortable expressing both the positive (e.g. reasons why they eat high fat foods) and negative aspects of their current behavior as well as the pros and cons for change. To achieve these ends, MI counselors rely heavily on reflective listening, rather than on direct questioning, persuasion or advice giving. To help shift decisional balance, counselors selectively reflect and reinforce positive change statements expressed by the client.

The tone of the MI encounter is non-judgmental, empathetic and encouraging. It is client, rather than practitioner, centered. The MI counselor acts more as an engaged problem-solving partner or therapeutic guide than an aloof, authoritarian or omniscient provider of advice, insight and counsel (Rogers, 1986, 1987; Rollnick *et al.*, 1999). The style used to present information and develop discrepancy is sometimes referred to as 'the Columbo technique', based on the television character portrayed by Peter Falk in the 1970s. This befuddled but effective detective was able to bring his suspects out by probing, with innocent curiosity, elements of their stories or alibis that seemed inconsistent or implausible. Employing this neutral yet inquisitive tone allows the counselor to address discrepancies in client beliefs or behaviors without instilling defensiveness or attempting refutation. Consistent with this tone, MI counselors avoid argumentation; they 'roll with resistance' rather than fight it. As noted by Rollnick, the MI encounter should resemble a dance more than a wrestling match (Rollnick *et al.*, 1999). Although questions, reflections and concerns are expressed in a non-judgmental manner, moral neutrality should not be equated with emotional detachment. It is essential that the counselor express empathy and support efficacy.

Within the MI encounter, clients are encouraged to talk as much or more than counselors and ideally clients do most of the psychologic work. This

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includes helping clients to think about and verbally express their own reasons for and against change, how their current health behavior may conflict with their health goals, and how their current behavior or health status impacts on their ability to achieve their life goals or live out their core values.

Unlike traditional health education that emphasizes providing information, MI counselors rarely provide information or advice until the clients have first presented their own understanding of the situation or their own suggestions for overcoming obstacles or initiating change. Ideally, it is the client rather than the counselor that makes the argument for change and describes the course of action. Although there is a place within an MI encounter for imparting information and advising a course of action, it is best delivered after clients have requested such counsel or the counselor has requested permission to offer their own ideas and thoughts, additional information or professional advice. Similarly, when the counselor is concerned about the feasibility of a client's plans for change, such concerns are gently raised, by seeking permission to share them and with comments such as 'I am wondering how well you think your plan fits with your overall goals and family situation', again delivered in a neutral, non-judgmental manner. The goal again is to help clients acknowledge and process the limitations of their plans.

Application of MI for this project

A key element of MI is eliciting self-motivational statements, more recently referred to as change talk (CT). To elicit CT we are using a method developed by Rollnick (Rollnick *et al.*, 1997) for a smoking cessation intervention delivered by physicians (Rollnick *et al.*, 1997; Butler *et al.*, 1999). Our group has previously used this method to modify F & V intake among AA adults (Resnicow *et al.*, 2000a). In brief, this technique begins with two questions: (1) 'On a scale of 0–10 (with 10 being the highest), how motivated/interested are you in increasing your fruit/vegetable consumption (or increasing PA)?' and (2) 'On a scale of 0–10 (with 10 being the highest), assuming you wanted to, how confident are you that you could increase your fruit/vegetable consumption (or increase your PA)?'. Each of the two questions are asked separately for fruits and vegetables.

Table IV. *List of values, attributes and goals*

Good parent	Attractive
Good spouse/partner	Disciplined
Good community member	Responsible
Strong	In control
On top of things	Respected at work
Competent	Athletic
Spiritual	Not hypocritical
Respected at home	Energetic
Good Christian (or Jew, Muslim, etc.)	Considerate
Successful	Youthful
Independent	

Following the client's response, the counselor asks two questions: (1) 'Why did you not choose a lower number, like a 1 or 2?' (this is used to elicit positive motivating statements) and (2) 'Why did you not choose a higher number?' (this is used to elicit barriers). If barriers are presented, counselors prompt participants to solve their own barriers. After the participant has exhausted his/her own solutions (or in the event that none are offered), the counselor seeks permission to list other solutions 'that have worked for other people'. A key aim of this technique is to encourage the client to voice the argument for change rather than the counselor.

A novel element of our MI intervention in this project is the use of a values clarification strategy, based on the work of Miller (Miller and C'deBaca, 1994). In the original method, the client was asked to sort a list of approximately 70 values in terms of personal importance and to select around five that are most important. The revised protocol uses a modified and shortened set of values/attributes contained in Table IV. Clients are asked to briefly discuss why the values/goals selected are important to them, and then they explore what connection, if any, they see between their current health behavior and their ability to achieve these goals or live out these values. Alternatively, the counselor may ask how changing their health behavior may

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be related to these goals or values. Initial results using this strategy appear promising. In the process of linking health behavior to core values, considerable change talk has been elicited.

This study, consistent with the original request for application, addresses two health behaviors, F & V intake and PA. Two of the four MI calls will address F & V intake and the remaining two will address PA. However, to maintain a client-centered model of intervention delivery that is consistent with MI, during the first and third calls participants are provided with a choice of which topic they would like to address. If they elect to address F & V during their first call, PA will be addressed in the second call. This choice is repeated during the third call.

For the first and second calls (depending on whether the participant previously reported materials use), the participant's use of the key intervention components (i.e. video and cookbook) is briefly reviewed and participants are asked to what degree they have read or watched them. Participants are provided with verbal reinforcement for having used materials and encouragement to use the remaining components. At the end of the call, the participant is asked to restate what was agreed upon and a verbal contract is secured.

With regard to intervention dose, we have chosen four calls as we believe this represents a reasonable balance between intensity and replicability. More calls might induce greater effects, but may be less generalizable. Moreover, in our prior Eat For Life study, during post-test focus groups participants indicated that the preferred frequency of contact would be around 3–4 times a year. Counselors are Masters- or Doctoral-level psychologists who receive approximately 6 h of initial training and ongoing supervision. The protocol is contained in a detailed script that ensures the primary strategies are executed, but allows for spontaneous discussion and reflective listening. All MI sessions are audiotaped and counselors self-rate their fidelity to the protocol after each call using a standardized form. Two clinical supervisors periodically rate the audiotaped encounters, and meet with the counselors to compare their ratings and discuss possible areas for improvement. The four MI calls will be delivered at approximately weeks 3, 12, 24 and 40. Based on our experience in conducting MI calls for our Eat For Life and Harlem Health Connection Projects (Resnicow *et al.*, 1997, 2000a, 2002), most calls will be made during weekday evenings between 5.00 and 9.00 p.m., and on weekend days (excluding Sunday church hours, 9.00 a.m.–3 p.m.). We project being able to contact 85% of the cohort at least once and 60–70% all 4 times. Total time per completed call is approximately 20–30 min.

Logic model

We propose that the culturally tailored materials for Groups 2 and 3 will be more acceptable and salient than the standard materials provided to the comparison group. Increased acceptability should result in increased materials use and enhanced salience should result in greater behavioral change. For the self-help intervention, we hypothesize that increases in F & V intake and PA will be mediated by changes in social support, outcome expectations and self-efficacy. A secondary proposed mediator is perceived acceptability and use of the materials, which we propose will be greater in Group 2 (and 3) versus Group 1.

For the MI intervention, we propose that changes in F & V intake and PA will be mediated by changes in intrinsic motivation, assessed with an adapted version of the measure developed by Williams *et al*. (Williams *et al.*, 1998a,b, 1999).

Conclusion

The study is unique in several regards, including: the population, which will include at least 40% middle and upper socioeconomic status AA, the multiple behavior focus (diet and PA), and the church setting. The three-group design will enable us to test two somewhat unique interventions, each based on different theoretical models. The primary question addressed by comparison of Groups 1 and 2 is the effectiveness of self-help nutrition and PA interventions developed based on our model of cultural sensitivity compared to standard materials.

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Comparison of Groups 3 and 2 will examine the effectiveness of telephone-based MI to modify diet and PA patterns. In this study, Masters-trained psychologists will deliver the motivational interviewing intervention. The extent to which health educators, other medical professionals and even lay counselors may be capable of delivering effective motivational interviewing merits examination in future studies.

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