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## Readiness to use compensatory strategies among older adults with functional difficulties

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### Abstract

**Background**—Compensatory strategies (behavioral/environmental modifications) can reduce the difficulties of performing daily living activities, fear of falling, and mortality risk. However, individuals vary in their readiness to use strategies. We examined characteristics associated with readiness to use compensatory strategies, the extent to which level of readiness changed from participation in an intervention (Advancing Better Living for Elders (ABLE)) providing compensatory strategies, and factors predictive of change in readiness level.

**Methods**—Data from a randomized trial were used. Participants were 148 older adults assigned to the ABLE intervention designed to enhance daily function through compensatory strategy use. Baseline measures included demographic characteristics, functional difficulty level, presence/absence of depressive symptoms, compensatory strategy use, and social support. At initial (2 weeks from baseline) and final (6 months) ABLE sessions, interventionists rated readiness (1 = precontemplation; 2 = contemplation; 3 = preparation; 4 = action/maintenance) of participants to use strategies. Ordinal logistic regression was used to identify baseline characteristics associated with initial readiness rating. A McNemar-Bowker test of symmetry was used to describe change in readiness, and binary logistic regression was used to identify baseline predictors of change in readiness (from initial to final intervention session).

**Results**—At the initial intervention session, 70.3% ( $N = 104$ ) scored in pre-action (precontemplation/contemplation, preparation), and 29.7% ( $N = 44$ ) in action/maintenance. Depressive symptomatology ( $\chi^2(2) = 9.08, p = 0.011$ ) and low compensatory strategy use ( $F(2, 147) = 8.44, p = 0.001$ ) at baseline were associated with lower readiness levels at initial ABLE session. By final ABLE session, most participants demonstrated greater readiness: 72% ( $N = 105$ ) in action/maintenance, 28% ( $N = 41$ ) in pre-action (two participants dropped out). A significant

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baseline predictor of positive change in readiness (from initial to final session) was higher social support levels ( $b = 0.10$ ,  $SE = 0.05$ ,  $Wald = 4.98$ ,  $p = 0.026$ ).

**Conclusion**—Whereas presence of depressive symptomatology and lower use of compensatory strategies at baseline were associated with lower readiness at initial intervention session, neither predicted change in readiness level. Thus, mood and prior compensatory strategy use do not effect enhancements in readiness to use strategies provided in an intervention. Baseline social support was the strongest predictor of change in readiness suggesting that interventions may need to involve older adults' social networks to enhance acceptability of compensatory strategy use.

## Keywords

home care; functional disability; home modification

## Introduction

Having difficulty performing instrumental and basic activities of daily living (IADL, ADL) is a major adverse outcome of chronic and geriatric conditions which poses serious threats to independence, health, and well-being for older adults (Fried *et al.*, 2004). Moreover, physical limitations in IADLs and ADLs are associated with physical and psychological consequences including increased risks of falling and fall-related injuries, disengagement or activity restriction, social isolation, depression and mortality (Arfken *et al.*, 1994).

Interventions such as geriatric home visits that provide compensatory techniques (e.g. pacing self, using grab bars) to enhance self-management and address physical difficulties (Stuck *et al.*, 2002) have demonstrated important benefits including reduced disability, fall risk, and fear of falling, as well as increased cost savings (Mann *et al.*, 1999) and survivorship (Gitlin *et al.*, 2006a; 2009). However, individuals vary as to their willingness to adopt compensatory strategies as they may be perceived as behaviorally demanding or stigmatizing (Gitlin, 1995). Thus, understanding the level of readiness of older adults to adopt compensatory strategies requiring behavioral or environmental modifications may be an important consideration in designing and implementing interventions to enhance everyday functioning at home.

We conducted an exploratory study to begin to characterize the readiness level of community-dwelling elders who participated in a six-month home intervention, Advancing Better Living for Elders (ABLE). ABLE was previously shown to reduce difficulties in performing IADLs and ADLs, fear of falling and mortality risk in a randomized trial with 319 functionally vulnerable older adults (Gitlin, *et al.*, 2006a; 2006b; 2009). In this exploratory study, we sought to: (1) identify baseline characteristics of intervention participants who were rated by interventionists as being at different stages of readiness at the start of the intervention; (2) describe the extent to which participants changed their readiness level from initial to final treatment sessions (six months later); and (3) identify baseline factors that predicted positive change in readiness level (from initial to final intervention session).

We explored readiness within the context of a randomized trial that tested ABLE with 319 community-dwelling functionally vulnerable older adults. ABLE involved up to six sessions with an occupational therapist (OT) who assessed client-identified problem areas, home environmental features and functional performance. Also, one session by a physical therapist offered fall prevention strategies and balance and strength training. As there are no standardized readiness scales concerning compensatory strategy use, we developed a rating approach based on the Transtheoretical Model of behavior change (TTM; Prochaska *et al.*, 1992) which was used by OTs at the initial and final treatment sessions. To our knowledge, this is the first study to evaluate level of readiness to use behavioral and environmental strategies for enhancing independent functioning at home.

TTM is an integrative framework for understanding health behavior change that focuses on personal decision-making and intention to engage in healthy behaviors. Since its introduction in the early 1980s, it has been used to study engagement in an array of health behaviors that include but are not limited to smoking cessation (Prochaska *et al.*, 1988), diet (Armitage, 2006), physical activity (Rhodes and Plotnikoff, 2006), and stress management (Evers *et al.*, 2006). More recently, there has been interest in applying constructs from the TTM to the management of age-related chronic conditions including heart failure (McKibbin, *et al.*, 2007), respiratory illness (Carruth *et al.*, 2008), and arthritis (Arthur *et al.*, 2009), as these conditions require lifestyle modifications as part of disease self-management.

Central to the TTM are five developmental stages of change (SOC) associated with readiness to engage in or abstain from a particular health behavior: precontemplation, contemplation, preparation, action and maintenance. In *precontemplation*, an individual is not thinking about changing behavior, nor are they sufficiently aware of the health consequences of their behavior. Applied to our study, individuals at this stage believe that functional difficulties are due to aging and that nothing can be done to offset their negative consequences. In *contemplation*, an individual becomes aware that a problem exists and begins to think about taking action (e.g. exploring ways of reducing the impact of disability). *Preparation* is characterized by an intention to take action, and an orientation to the targeted behavior change (e.g. active consideration of use of an assistive device); that is, an individual may not have modified or altered a behavior (e.g. using a grab bar), but he or she may have moved beyond thinking about taking action to developing a plan of action (e.g. identifying equipment that may be helpful and how to obtain it). When behavior has been consistently modified or altered, the individual is considered to be in the *action* stage (actively using compensatory strategies as part of daily routines). Movement to *maintenance* occurs when the individual sustains the desired behavioral change for six months or more. There is considerable evidence for the construct validity of these stages across a variety of health behaviors, with key cognitive and behavioral processes distinguishing the stages (Prochaska *et al.*, 1988; 1992), although there is debate as to whether the TTM represents qualitatively distinct and mutually exclusive stages (Herzog, 2008).

Our research adds to the TTM literature by examining readiness within the context of an intervention designed to introduce behavioral and environmental modifications to vulnerable community-dwelling older adults, a population hitherto not considered in this body of research. We also consider the impact of a broader range of factors not previously

considered in health behavior change models such as physical and social factors. Further, because readiness was measured at two time points (initial and final treatment session six months later), we examine readiness cross-sectionally and longitudinally to evaluate whether readiness is a state that is responsive to intervention. Few studies have examined change in readiness over time.

To identify potential variables associated with readiness, we drew upon previous studies of adherence to medical and lifestyle interventions in older adults. Four sets of variables were included: background demographic characteristics (age, gender, race, education, living arrangement and income); daily functioning including level of disability and mood; use of compensatory strategies; and support level.

Although sociodemographic, physical and psychological variables are frequently used in adherence studies, findings are inconsistent as to their respective influence on treatment. Demographic and physical variables do not appear to predict adherence consistently (Chee *et al.*, 2007; Gitlin *et al.*, 1999). Alternately, psychological variables such as depression, and social variables such as perceived social support, show greater consistency. Depression has been shown to be negatively correlated (DiMatteo *et al.*, 2000) and social support positively correlated with medical adherence (Simoni *et al.*, 2006).

We also considered use of compensatory strategies drawing upon the framework of the Life Span Theory of Control (Schulz and Heckhausen, 1996; Heckhausen *et al.*, 2010), a developmental theory of control that has been applied to adaptation to changes in health. In this model, threats to or actual losses in the ability to control important outcomes, as those seen in functional declines, activate use of cognitive and behavioral compensatory strategies that are designed to buffer threats and losses (Schulz *et al.*, 1994). Primary control strategies target the external environment and primarily involve behavioral strategies to attain goals, whereas secondary control strategies target the self and primarily involve cognitive strategies to attain goals. It has been shown that use of these types of strategies moderates the relationship between functional decline and depression (Wrosch *et al.*, 2002; Gitlin *et al.*, 2007), influences adjustment to health declines (Wahl *et al.*, 2004), predicts hospital outcomes (Chipperfield and Perry, 2006) and mortality (Gitlin *et al.*, 2006b; Heckhausen *et al.*, 2010). Here, we examine whether initial use of compensatory strategies is correlated with initial readiness and change in readiness. We reasoned that previous exposure to compensatory strategy use would be associated with a higher level of readiness to engage in the intervention and movement in readiness level over time.

## Methods

### Participants

As reported in detail elsewhere (Gitlin *et al.*, 2006b), to participate in the original randomized trial, participants were required to be ambulatory, living in the community, 70 years or older, English speaking, experiencing functional difficulties and to have Mini-mental State Examination scores  $\geq 24$  (MMSE; Folstein *et al.*, 1975). Participants were recruited through social service agencies, media announcements and posted flyers between 2000 and 2003. After a telephone screen that determined eligibility, baseline interviews

were conducted in the home by trained interviewers. Written informed consent was obtained at the baseline interview using an approved Institutional Review Board form. Participants were then randomized into control and experimental groups and reassessed at 6 and 12 months. Of 319 who were initially enrolled, 160 and 159 participants were randomized to experimental and control conditions, respectively.

This study includes participants assigned to the intervention group only. It utilizes two data sources: data gathered by interviewers at a baseline interview conducted prior to randomization to group assignments; and data gathered by interventionists at initial and final (six-month) treatment sessions. Of the original 160 randomized to intervention, 148 were included in the present sample; one participant refused the intervention and 11 had incomplete data on the variables of interest. However, we found no large or statistically significant differences between those included ( $N = 148$ ) and those not included ( $N = 12$ ) in the analytical sample for this study for any of the basic demographic characteristics.

## Intervention

As reported in detail elsewhere (Gitlin *et al.*, 2006b), the six-month phase of the ABLE intervention, involved five sessions by an occupational therapist who worked with participants to identify functional concerns and provided compensatory strategies including energy conservation techniques (e.g. sit to perform a task), environmental simplification (e.g. remove clutter, keep objects for needed task together), small home modifications (e.g. grab bars, rails) and devices (e.g. medication dispenser, large telephone) to enhance efficiency and safety in performing targeted areas of difficulty. An additional home visit by a physical therapist provided training in safe fall, fall recovery techniques, strength and balance training. Intervention strategies were control-oriented in that they were designed to enhance the ability of participants to achieve their desired functional goals by offsetting limitations. Occupational therapy interventionists identified participant readiness level in the initial clinical interview. Although the intervention was not specifically tailored or staged to a person's readiness level, the initial rating of readiness did influence the intervention pace. For example, for those scored at low readiness, interventionists initially provided education about compensatory strategies and the role of the environment in supporting or deterring function and offered only one strategy at a time until the participant demonstrated greater awareness and willingness to try strategies. For those who scored at an initially high readiness level, the interventionist would offer a broader array and number of compensatory strategies.

## Baseline measures

Trained interviewers (not OTs) conducted a face-to-face interview prior to randomization and the start of the intervention. Interviewers were thus unaware of treatment assignment. The interview included background characteristics, standardized measures of health and well-being, social support and compensatory strategy use.

Participant demographic characteristics included age, gender, race (white or non-white), living arrangement (alone/with others), education (<high school, high school, >high school),

and financial difficulty (1 = no difficulty, 2 = some difficulty, 3 = moderate difficulty, 4 = a great deal of difficulty paying for basics).

Functional difficulty was assessed using a 22-item measure (Ettinger *et al.*, 1997) that included six IADLs (doing light housework, shopping, using the telephone, taking medications, meal preparation, managing money) (Lawton and Brody, 1969), six ADLs (bathing, dressing upper body, dressing lower body, grooming, toileting, eating) (Katz *et al.*, 1963), six mobility-related items (getting in and out of the car, walking indoors, walking one block, climbing one flight of stairs, moving in and out of chair, moving in and out of bed), and four items that reflect functional impairment (gripping with hands, raising hands above the head, bending, opening containers) (Verbrugge and Jette, 1994). Participants rated difficulty performing each item in the past month from 1 (no difficulty) to 5 (unable to do because of health problems). Mean ratings across 22 items were computed with higher scores indicating greater functional difficulty (Cronbach's  $\alpha = 0.81$  for this sample).

To measure depressive symptoms, we used the 20-item Center for Epidemiologic Studies Depression scale (CES-D) (Radloff, 1977). Participants reported the frequency of symptoms during the past week using a four-point scale (0 = rarely, 3 = most of the time; Cronbach's  $\alpha = 0.75$  for this sample). Previous research has shown the CES-D to have excellent reliability (split halves correlations 0.85 to 0.92), and discriminant and convergent validity (Radloff and Teri, 1986). Scores of 16 and above indicate presence of clinical depressive symptoms in both young and older adults. We used this cut-off score to develop a dichotomous variable (<16 = no depressive symptoms; 16 = presence of depressive symptoms) to obtain a clinically meaningful understanding of the relationship of symptomatology to readiness.

Compensatory strategy use was assessed using an eight-item investigator-developed measure, modeled after the health engagement scale (Wrosch *et al.*, 2002) and used in prior work (Gitlin *et al.*, 2006a; 2007). Items reflected behavioral (e.g. I pace myself so I do not get too tired) and cognitive strategies (e.g. when I have difficulty with daily activities such as dressing or bathing, I remind myself that I am not to blame for it) for managing threats to or actual loss of control over performing everyday activities due to functional difficulties. Participants rated the extent to which each item was true using a scale from 1 (not true at all) to 4 (very much true). A measure of strategy use was derived by averaging responses to items, with higher values reflecting greater strategy use (Cronbach's  $\alpha = 0.62$  for this sample).

Social support was measured by using eight items from the NIH Resources for Enhancing Alzheimer's Caregivers Health (REACH) trial (Belle *et al.*, 2006) that assessed four domains of support: social network size (how many relatives do you see or hear from at least once a month?); frequency of contact (how often do you see or hear from the relative with whom you have the most contact?); level of emotional support (in the past month, how often has someone provided comfort to you?); and level of informational support (in the past month, how often has someone suggested some action you should take in dealing with a problem?). Items were scored along a four-point scale (1 = never, 4 = very often). Scores were summed and higher values reflected greater perceived social support (Cronbach's  $\alpha = 0.70$  for this sample).



## Readiness measure

Interventionists rated readiness level at the initial (two weeks from the baseline interview) and final (six months from baseline) treatment sessions based on clinical interviewing and direct observation of use of compensatory strategies. Readiness assessments were reviewed at monthly project meetings, which included members of the research team and interventionists. Interventionists presented cases and readiness levels and the team discussed ratings until unanimous agreement was reached.

To assess readiness, we developed a two-dimensional measure reflecting a participant's acknowledgement of functional deficit areas and a willingness to try different strategies to make things easier. The four levels of readiness were adapted from other studies focusing on healthy behavioral changes in older adults (Burbank *et al.*, 2000; McNulty *et al.*, 2003). A rating of 1 (precontemplation) indicated a lack of awareness regarding functional deficits and an unwillingness to change. A rating of 2 (contemplation) indicated that although the participant acknowledged functional deficits, and was thinking about change, they were not yet ready to take action. A rating of 3 (preparation) corresponded to an awareness that a problem existed, and active efforts to try different interventions. Finally, a rating of 4 (action/maintenance) was given to those showing an understanding of their disability and active willingness to try different strategies. Note that we combined action and maintenance given that it was not possible for interventionists to evaluate long-term maintenance of behavior change.

To derive preliminary validation of our readiness measurement approach, we examined the association of treatment implementation factors to changes in readiness from initial (two weeks after baseline) to final (six-month) ABLE treatment sessions. We reasoned that changes in readiness should reflect observable treatment delivery and process factors. Three treatment-based measures were considered: number of completed treatment sessions, mean time per treatment session, and total number of intervention strategies integrated into daily routines (as observed by interventionist or reported by participant). Using logistic regression analysis, we entered treatment outcomes as predictor variables, and change in readiness (remained in pre-action vs moved to action) as the criterion variable. We found that change in readiness was associated with greater integration of compensatory strategies provided in the intervention ( $b = 0.09$ ,  $SE = 0.04$ , Wald = 6.37,  $p = 0.012$ ). For those who moved to action (stage 4), the mean number of strategies integrated was 12.35 ( $SD = 7.06$ ). In contrast, for those who remained in pre-action (stages 2 and 3), the mean number of strategies integrated was 8.82 ( $SD = 7.17$ ). The number of completed treatment sessions and mean time per treatment session were not significant, although mean time per treatment approached significance ( $p = 0.08$ ). Those who remained in pre-action spent slightly longer time per treatment session ( $M = 53.90$ ,  $SD = 13.51$ ) than those who moved to action ( $M = 52.50$ ,  $SD = 11.82$ ). Thus, change in readiness was associated with corresponding behavioral and environmental changes as the TTM model would predict.

## Design and data analysis

The independent variables, which included demographic background information, functional difficulties, presence/absence of depressive symptoms, compensatory strategy use, and

social support were collected at baseline prior to the start of the intervention by interviewers masked to study assignment. Readiness, the dependent variable, was measured at the initial intervention session (two weeks from the baseline interview) and again, at the six-month closure session by interventionists. At the initial and six-month ratings of readiness, we found only one participant in the precontemplation stage. Thus, for the purposes of all analyses, the stages of precontemplation and contemplation were collapsed.

We first computed descriptive statistics for baseline variables including demographic background information, functional difficulties, depressive symptoms, compensatory strategy use, and social support for the sample. To examine potential multicollinearity effects, we calculated appropriate parametric (Pearson  $r$ ) and nonparametric (Kendall's tau  $b$ ) correlation coefficients between independent variables (Table 1). We also performed a regression analysis to examine variance inflation factor (VIF) effects. Correlations, although significant, ranged between -0.28 and 0.24, well below values indicative of collinearity; VIF values were less than 2, also far below values ( $>10$ ) indicative of collinearity (Freund and Wilson, 1998).

Next, we created 15 interaction products among demographic variables that were included in this study (age, gender, race, education, income and living arrangement) in order to determine whether the effect of any of these independent variables on readiness might be moderated by a third variable. Demographic variables and interaction terms were then entered into a hierarchical regression analysis in which interaction terms were entered in the first block (backward) and the demographic variables in the second block. Two interaction terms were significant (gender by race and race by financial difficulty paying for basics) which were then included in the subsequent ordinal regression analysis.

Three analyses to explore our research questions were pursued. First, ordinal logistic regression analysis was used to identify baseline characteristics associated with initial readiness level. Second, a McNemar-Bowker test of symmetry was used to describe the extent to which participants changed in readiness level from initial to final ABLE sessions. Finally, binary logistic regression was used to identify baseline factors that predicted change in readiness (initial to final ABLE session). SPSS version 16.0 was used for all analyses.

## Results

### Sample characteristics

Overall, the sample was composed of participants who were relatively old ( $M = 79.30$  years,  $SD = 6.04$ ) and female (82.4%). There were approximately equal numbers of whites (51.4%) and non-whites (48.6%), the vast majority of the latter (96%) being African American, and almost two-thirds (64.2%) reported living alone. Overall, participants reported “somewhat” to a “great deal” of difficulty paying for basics ( $M = 2.53$ ,  $SD = 1.07$ ). Level of education was equally distributed; one-third reported less than a high school education, approximately one-third reported a high school education, and slightly more than one-third reported more than a high school education. Functional difficulties reported by participants ranged from “some” to “a lot” of difficulty ( $M = 2.18$ ,  $SD = 0.50$ ), compensatory strategy use was



moderate to high ( $M = 3.27$ ,  $SD = 0.47$ ), and level of social support was moderate to high ( $M = 20.71$ ,  $SD = 6.06$ ) (Table 2).

### Univariate analyses of initial readiness and sample characteristics

Baseline characteristics were examined across the four readiness groups with differences found only in depressive symptomatology and compensatory strategy use. Participants with CES-D scores  $\geq 16$  (presence of depressive symptoms) were more likely to be found in precontemplation/contemplation, and less likely to be found in action/maintenance stages of readiness, than those with CES-D scores  $< 16$  ( $\chi^2(2) = 9.08$ ,  $p = 0.011$ ). Thus, lower levels of readiness were associated with having depressive symptomatology.

Compensatory strategy use also differed as a function of readiness level,  $F(2, 147) = 8.44$ ,  $p = 0.001$ . Although no differences were found between action/maintenance and preparation stages of readiness on extent of strategy use at baseline, those in action/maintenance ( $M = 3.46$ ,  $SD = 0.33$ ) and preparation ( $M = 3.29$ ,  $SD = 0.47$ ) reported significantly higher strategy use than those in precontemplation/contemplation ( $M = 3.07$ ,  $SD = 0.52$ ). Thus, those with higher levels of readiness had previously used more compensatory strategies than those with lower levels of readiness at the start of the intervention.

### Baseline factors associated with initial readiness

Using ordinal regression analysis, we examined the relationship between baseline demographic background characteristics, functional difficulties, presence of depressive symptoms, compensatory strategy use and social support on initial readiness level. Results are presented in Table 3. Overall, the model was statistically significant ( $p = 0.001$ ) and explained 26% of the variance.

Several demographic background variables were associated with readiness in the multivariate analysis with the main effect of age being significant (Table 3). A negative parameter estimate ( $b = -0.06$ ,  $SE = 0.03$ ) suggests that older participants were less likely to be at higher stages of readiness than those who were younger at the start of the intervention. The main effects of race ( $b = 3.21$ ,  $SE = 1.20$ ) and difficulty paying for basics ( $b = -0.47$ ,  $SE = 0.22$ ) were also significant. However, main effects were qualified by an interaction between race and financial difficulty ( $b = 0.80$ ,  $SE = 0.33$ , Wald = 6.03,  $p = 0.014$ ), suggesting that income moderated the effect of race on readiness.

We examined the interaction of race and difficulty paying for basics on initial readiness by computing a series of  $\chi^2$  tests of independence. The relationship between race and readiness was examined for each level (1 – not at all to 4-very) of financial difficulty. Tests revealed no significant relationship between race and readiness for lower levels of financial difficulty. However, we did find a significant relationship between race and readiness for those reporting the greatest financial difficulty,  $\chi^2(2) = 10.63$ ,  $p = 0.005$ . White and non-white participants showed different readiness patterns in the face of financial difficulties. White participants were largely found in precontemplation/contemplation (64%) and preparation stages of readiness (36%), whereas non-white participants were largely found in preparation (50%) and action/maintenance (39%) stages of readiness.

As was found in the univariate analyses, compensatory strategy use ( $b = 1.11$ ,  $SE = 0.38$ ) and depressive symptomatology ( $b = 0.90$ ,  $SE = 0.37$ ) at baseline were significantly associated with readiness at the start of the intervention. A one-unit change in compensatory strategy use increased the odds of being at a higher stage of readiness by a factor of 3.02. Moreover, those participants scoring  $<16$  on the CES-D (e.g. non-depressive symptoms) were significantly more likely to be at a higher stage of readiness than those with scores  $\geq 16$  (e.g. clinically significant symptomatology).

In summary, baseline characteristics found to be associated with initial readiness were age, race, difficulty paying for basics, depressive symptomatology and compensatory strategy use.

### Changes in readiness from initial to six-month intervention sessions

As two participants dropped out of the study during the intervention, these analyses included 146 completers. At the initial intervention session, 70.5% ( $N = 103$ ) of the sample was found to be in one of the pre-action stages (precontemplation/contemplation and preparation), and only 29.5% ( $N = 43$ ) was found to be in action/maintenance (Table 4). By six months, proportions were reversed with 72% ( $N = 105$ ) in action/maintenance and 28% ( $N = 41$ ) in one of the pre-action stages. A McNemar-Bowker test revealed that the shift in readiness from initial to final treatment session was significant,  $\chi^2(3) = 80.182$ ,  $p < 0.001$ ,  $N = 146$ .

Of the 103 participants initially in a pre-action stage, nearly two-thirds (60%) moved to action/maintenance, the highest readiness level by the final treatment session. Eighteen individuals began in precontemplation/contemplation and 44 individuals began in preparation before moving to action/maintenance. All of those who began in action/maintenance at the initial treatment session maintained this status over the course of the intervention.

### Baseline factors predicting change in readiness from initial to six-month intervention sessions

By the final treatment session, there were three groups of intervention participants: those who maintained the highest level of readiness (action/maintenance) from initial to final sessions ( $N = 43$ ); those who shifted from a lower stage of readiness to action/maintenance ( $N = 62$ ); and those who remained in a pre-action stage ( $N = 41$ ). To identify factors that predicted transition from initial to final treatment session in readiness level, we focused on the two latter groups; participants who began in one of the pre-action stages at baseline (precontemplation/contemplation, preparation) and maintained this status at the final treatment session ( $N = 41$ ) referred to as the no change group, and those who began in one of the pre-action stages but who moved to action/maintenance ( $N = 62$ ) by the final session, referred to as the change group. Hence, we excluded from this analysis those who maintained their high action/maintenance level from initial to final treatment session ( $N = 43$ ).

As we excluded those who maintained high action/maintenance levels ( $N = 43$ ) from initial to final treatment, the sample size was significantly reduced ( $N = 103$ ). To increase power in

the analysis, we reduced the number of predictor variables by excluding interaction terms (gender by race and race by difficulty paying for basics). Therefore, only the main effects of demographic variables were examined. Demographic background characteristics, functional difficulties, compensatory strategy use and social support were entered as baseline predictors in a binary logistic regression analysis. The model was statistically significant ( $p = 0.003$ ) and explained 33% of the variance (Table 5).

As shown, social support level was the only baseline characteristic that predicted change in readiness. Those with higher levels of support at baseline were more likely to move to action/maintenance by the final treatment session than those with lower social support ( $b = 0.11$ ,  $SE = 0.04$ , Wald = 6.14,  $p = 0.013$ ). Also, we found two marginally significant findings; age ( $b = -0.08$ ,  $SE = 0.05$ , Wald = 3.46,  $p = 0.063$ ) and functional difficulty ( $b = -0.95$ ,  $SE = 0.54$ , Wald = 3.03,  $p = 0.082$ ). Younger participants with lower levels of functional difficulty were more likely to move to action/maintenance by 6 months, than older participants with higher levels of functional difficulty.

## Discussion

This exploratory study evaluated the construct of readiness among participants engaged in an intervention designed to introduce compensatory strategies (behavioral and environmental modifications) to offset functional difficulties. We identified baseline factors that differentiated levels of readiness among participants at the start of the intervention and change in readiness over the course of the intervention. We show that it is possible to move older adults to higher levels of readiness to use helpful self-management strategies through a client-centered, tailored home-based intervention.

Although participants may be similarly motivated to take part in an intervention study such as ABLE (they had volunteered), our findings suggest that they differed at the start of the program in their readiness to adopt behavioral and environmental strategies that compensate for functional difficulties. Whereas only one participant was at the precontemplative level, participants did differ in the extent to which they acknowledged functional deficit areas and in their willingness to try different strategies to make daily living easier. Furthermore, we found that initial readiness level was associated with several baseline characteristics: age, race by level of financial difficulty, compensatory strategy use, and depressive symptoms.

Being younger was associated with high initial readiness levels. Although this finding is consistent with other studies on readiness to engage in physical activity, it is unclear why younger versus older people would be at a higher readiness level to use compensatory strategies (Pedersen *et al.*, 2009). Given that functional difficulty levels were similar across age groups at baseline, this cannot account for the age difference. It may be that the older age group had lived with functional problems for a longer time and were more likely to attribute difficulties to normal aging processes whereas the young old group did not.

As to the interaction of race and financial difficulty, we found that African American older adults with financial difficulties had higher readiness level than their white counterparts. Our previous research has shown that compared to whites, African American older adults use

more compensatory strategies for managing functional limitations (Gitlin *et al.*, 2007). This may reflect in part the resilience of this group and their ability to adopt strategies to alleviate everyday life challenges.

Those reporting greater use of active oriented compensatory strategies (e.g. I try to make changes to my home to help me stay independent), and cognitive oriented strategies (e.g. I often think about how important it is to stay healthy and independent) entered the study more “ready” to engage in the intervention and adopt strategies involving behavioral and environmental modifications. This may have implications for involving individuals with initially lower use of compensatory strategies in functional improvement interventions. These individuals may be reluctant to participate even though they could benefit from such programs. Future research is warranted to determine how to involve individuals effectively with low compensatory strategy use. The association between compensatory strategy use and initial readiness scores also provides further evidence of the validity of our approach to measuring readiness; participants reported extent of strategy use at the baseline interview administered by an interviewer using an eight-item scale whereas readiness level was derived by interventionists based on observations and clinical interview.

As to depression, those with higher levels of readiness were less likely to be depressed than those at lower levels of readiness at the start of the intervention. As higher levels of readiness reflect behavioral activation, it is not surprising that individuals with depressive symptoms had lower behavioral intentions. Depressive symptomatology is a common mental health problem in old age which is strongly associated with difficulty performing fundamental life tasks. The association between depressive symptoms and functional difficulties is well documented and may be reciprocal such that each may be a risk factor for the other (Lenze *et al.*, 2001). Our finding provides additional insight into this reciprocal relationship. Individuals with depressive symptoms may not be ready to use strategies that can offset functional decline; in turn, by not using strategies, individuals are unable to continue to engage in meaningful daily activities which may perpetuate the depression-functional decline cycle.

It is noteworthy that readiness increased significantly following intervention, with over 70% at the highest level of readiness by six months. By the end of the intervention, most participants not only acknowledged functional difficulties but were also making active attempts to deal with them. Consistent with previous intervention research, our findings show that a tailored intervention can increase readiness for behavioral change (Greaney *et al.*, 2008)

Of interest are the baseline factors that predicted change in readiness as well as those factors that did not. While depressive symptomatology was inversely associated with readiness at the start of the intervention, it did not predict change in readiness. It may be that one unintended consequence of an intervention that introduces compensatory strategy use is that it activates even those individuals with depressive symptomatology; so although level of depressive symptoms differed for readiness groups at the start, instruction in use of strategies helped to diminish those differences over time. This has important implications for functional improvement interventions including rehabilitation. It suggests that individuals

with depressive symptoms may not need to be treated first for depression prior to participating in behaviorally demanding interventions that improve function.

Initial compensatory strategy use also did not predict changes in readiness after the intervention. It may be that the intervention diminished these differences. Alternately, initial strategy use may have supported greater adherence to the intervention, and this in turn propelled an upward shift to action/maintenance. This is consistent with previous work showing an association between readiness and adherence in an intervention designed for dementia caregivers (Chee *et al.*, 2007). The data further suggest that an individual's stance toward using strategies is not static and hence, it is amenable to change through intervention. Finally, at the start of the intervention, readiness to change was associated with race and income such that older African Americans with financial difficulties had higher levels of readiness than their white counterparts. This may reflect in part the resilience of this group and their commitment to adopting strategies to alleviate everyday challenges. This is consistent with our previous research showing that control strategy use appears to be higher among older African American participants and use of strategies moderated the experience of depressive symptomatology over time, whereas this was not the case for white participants (Gitlin *et al.*, 2007).

Other background characteristics, including functional status at baseline, also did not predict change in readiness. Thus, individuals with diverse characteristics and functional capacity similarly enhanced their readiness states over time.

The only statistically significant predictors of an upward shift to action/maintenance were social support and two marginal effects of age and functional difficulty. By six months, compared to those in pre-action, those in action/maintenance were more likely to be younger and to report lower levels of functional difficulty at baseline. Again, the mechanism by which age predicts change in readiness is unclear. It suggests, however, that interventions might need to target the young old who begin to experience disability so they can age with extended exposure to compensatory strategy use.

Whereas social support was not associated with readiness at the start of the intervention, it was important in predicting changes in readiness: those with more social support entering the study were more likely to experience enhanced readiness by the end of the intervention. The link between readiness and social support is consistent with a growing literature demonstrating positive health benefits of social supports (for a review, see Uchino, 2009). Living arrangements were not a predictor such that both those who lived alone and those who lived with others had similar readiness levels at the start and after six months of intervention. Rather, it is the level of and satisfaction with support that appears to be important. Like compensatory strategy use, social support may be linked to readiness through its impact on adherence; those who start the intervention with high perceived social support may be more likely to adhere to treatment and ultimately move to action/maintenance. Prior research has shown that perceived social support is associated with healthy behavioral choices and cooperation with medical regimens (DiMatteo, 2004). Alternatively, social support may have a protective role. That is, it may provide a normative framework for making changes that may otherwise be perceived as stigmatizing. This has

important implications for intervention design. It suggests that inclusion of social networks in interventions that involve behavioral change may help elicit support for the adoption of strategies that potentially alter how a patient or client is perceived by and behave towards others.

There are several limitations of this study. First, ratings of readiness were measured by interventionists who carried out the intervention. The desire to perceive low readiness at the start of the intervention and then gains at its conclusion potentially could have influenced readiness assessments. Nevertheless, we believe this to be unlikely as we found that select baseline factors collected by independent raters masked to intervention differentiated readiness levels. A related point is that ratings were based on two dimensions: acknowledgment of functional difficulties and willingness to make changes. Although discussions at team meetings and confirmation of ratings were meant to address these issues, the potential impact on readiness ratings is unclear. Another related limitation is that readiness was measured using investigator-developed items. Although content validity was achieved with participating occupational therapists prior to study initiation, development of a reliable and valid measure of readiness based on variables identified in this study, for example, would be important in addressing this limitation in future research. Moreover, ratings of readiness in future research should be derived by raters who are independent of treatment delivery. However, we do show preliminary construct validity: readiness, for example, was associated with other treatment process variables as well as baseline compensatory strategy use levels. Finally, our sample volunteered to participate in an intervention designed to address functional concerns. Therefore, readiness levels may be higher in our sample than in the general population. This may limit the generalizability of the relationships reported here. Nevertheless, it should be noted that only 29% of the sample was rated at the highest readiness level at the start of the intervention suggesting that participants may have been ready to engage in a study but not necessarily to make behavioral and environmental changes. Finally, as readiness level was only collected for intervention participants, we do not have comparable data for control group subjects to determine whether change in readiness over time is related to intervention participation, to raters who were also interventionists, or that with time, participants naturally increase self-knowledge about their limitations and willingness to engage in behavioral change.

Despite these limitations, we show in this exploratory study that baseline factors discriminated individuals at the start of the intervention in terms of their readiness levels and was useful in describing changes in readiness over the course of intervention. The data also suggest that an individual's willingness to change is associated with a broad array of factors including demographic, psychological, cognitive/behavioral and social factors. Understanding the mechanisms by which invariant and modifiable factors exert their influence on readiness could contribute to designing targeted treatments to enhance efficiency and effectiveness of interventions designed to address functionality at home. Also, examining whether change in readiness level mediates treatment outcomes would be an important next research step.

With the changing age structure, the number of older adults living at home with disability is increasing. Thus, it is important to determine effective strategies for helping older adults



manage functional decline at home. Interventions must assess level of willingness to adopt compensatory strategies and then tailor strategies to support the unique cognitive and behavioral needs of older adults. The construct of readiness may serve as a helpful research and clinical tool to advance systematic tailoring of interventions in this area.

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**Table 1**  
**Intercorrelations (Pearson r and Kendall's tau\_b) between independent variables**

|                                 | 1 | 2     | 3      | 4      | 5      | 6       | 7       | 8       | 9       | 10      |
|---------------------------------|---|-------|--------|--------|--------|---------|---------|---------|---------|---------|
| 1. Age                          | – | –0.01 | –0.28* | –0.10  | –0.05  | –0.23** | –0.08   | 0.06    | –0.09   | –0.26** |
| 2. Gender                       |   | –     | –0.06  | 0.23** | –0.03  | –0.04   | –0.09   | 0.04    | 0.01    | –0.03   |
| 3. Race                         |   |       | –      | 0.12   | –0.18* | 0.21**  | 0.14*   | –0.19*  | 0.19**  | 0.21**  |
| 4. Living arrangement           |   |       |        | –      | –0.07  | 0.03    | 0.01    | –0.24** | 0.11    | 0.16*   |
| 5. Education                    |   |       |        |        | –      | –0.15*  | –0.19** | –0.09   | –0.03   | –0.11   |
| 6. Difficulty paying for basics |   |       |        |        |        | –       | 0.24**  | 0.10    | –0.01   | 0.13    |
| 7. Functional difficulty        |   |       |        |        |        |         | –       | 0.21*   | 0.08    | 0.10    |
| 8. Depression                   |   |       |        |        |        |         |         | –       | –0.19** | –0.19** |
| 9. Compensatory strategy use    |   |       |        |        |        |         |         |         | –       | 0.23*   |
| 10. Social support              |   |       |        |        |        |         |         |         |         | –       |

\*  
 $p < 0.05$

\*\*  
 $p < 0.01$

**Table 2**  
**Descriptive statistics for baseline measures by initial readiness status (N = 148)**

| CHARACTERISTIC                                      | PRECONTEMPLATION/<br>CONTEMPLATION (N = 44) | PREPARATION (N = 60) | ACTION/MAINTENANCE<br>(N = 44) | F    | $\chi^2$ | P            | TOTAL            |
|---|---|----------------------|--------------------------------|------|----------|--------------|------------------|
| Demographic   |   |                      |                                |      |          |              |                  |
| Age, Mean $\pm$ SD                                  | 80.77 $\pm$ 7.05                            | 78.75 $\pm$ 5.30     | 78.58 $\pm$ 5.77               | 1.90 |          | 0.154        | 79.30 $\pm$ 6.04 |
| Gender %  |   |                      |                                |      |          |              |                  |
| Male  | 34.60                                       | 42.30                | 23.10                          |      | 0.75     | 0.688        | 17.60            |
| Female  | 28.70                                       | 40.20                | 31.10                          |      |          |              | 82.40            |
| Race %  |   |                      |                                |      |          |              |                  |
| White   | 34.20                                       | 40.80                | 25.00                          |      | 2.23     | 0.327        | 51.40            |
| Non-White   | 25.00                                       | 40.30                | 34.70                          |      |          |              | 48.60            |
| Living Arrangement %                                |   |                      |                                |      |          |              |                  |
| Alone   | 28.40                                       | 39.00                | 32.60                          |      | 1.07     | 0.586        | 64.20            |
| With Others   | 32.10                                       | 43.40                | 24.50                          |      |          |              | 35.80            |
| Education %   |   |                      |                                |      |          |              |                  |
| <High School  | 28.00                                       | 36.00                | 36.00                          |      | 4.52     | 0.340        | 33.80            |
| High School   | 39.10                                       | 37.00                | 23.90                          |      |          |              | 31.10            |
| >High School  | 23.10                                       | 48.10                | 28.80                          |      |          |              | 35.10            |
| Difficulty paying for basics (income) Mean $\pm$ SD | 2.61 $\pm$ 1.02                             | 2.53 $\pm$ 1.10      | 2.43 $\pm$ 1.09                | 0.32 |          | 0.727        | 2.53 $\pm$ 1.07  |
| Health  |   |                      |                                |      |          |              |                  |
| Functional difficulty, Mean $\pm$ SD                | 2.27 $\pm$ 0.54                             | 2.08 $\pm$ 0.47      | 2.24 $\pm$ 0.50                | 2.16 |          | 0.119        | 2.18 $\pm$ 0.50  |
| Depression (CES-D)%                                 |   |                      |                                |      |          |              |                  |
| <16   | 21.40                                       | 40.50                | 38.10                          |      | 9.08     | <b>0.011</b> | 56.80            |
| >16   | 40.60                                       | 40.60                | 18.80                          |      |          |              | 43.20            |
| Compensatory strategy use, Mean $\pm$ SD            | 3.07 $\pm$ 0.52                             | 3.29 $\pm$ 0.47      | 3.46 $\pm$ 0.33                | 8.44 |          | <b>0.001</b> | 3.27 $\pm$ 0.47  |
| Social support, Mean $\pm$ SD                       | 19.61 $\pm$ 6.60                            | 20.77 $\pm$ 6.31     | 21.73 $\pm$ 5.03               | 1.35 |          | 0.263        | 20.71 $\pm$ 6.06 |

\* Items in bold indicate significance.

CES-D = Center for Epidemiologic Studies Depression scale.

**Table 3**  
**Ordinal regression: baseline factors associated with readiness at the start of the intervention (N = 148)**

| CHARACTERISTIC <sup>f</sup>                   | b        | SE   | OR    | WALD | P VALUE <sup>*</sup> | LOWER 95% CI | UPPER 95% CI |
|---|----------|------|-------|------|----------------------|--------------|--------------|
| <b>Demographic</b>                            |          |      |       |      |                      |              |              |
| Age   | -0.06    | 0.03 | 0.94  | 3.97 | <b>0.046</b>         | -0.12        | 0.00         |
| Gender (Female)                               |          |      |       |      |                      |              |              |
| Male  | 0.17     | 0.58 | 1.19  | 0.09 | 0.764                | -0.96        | 1.30         |
| Race <sup>d</sup> (Non-white)                 |          |      |       |      |                      |              |              |
| White   | 3.21     | 1.20 | 24.78 | 7.11 | <b>0.008</b>         | 0.85         | 5.56         |
| Living Arrangement <sup>b</sup> (with Others) |          |      |       |      |                      |              |              |
| Alone   | 0.55     | 0.38 | 1.73  | 2.11 | 0.147                | -0.19        | 1.29         |
| Education (>High School)                      |          |      |       |      |                      |              |              |
| <High School                                  | 0.35     | 0.42 | 1.42  | 0.69 | 0.407                | -0.48        | 1.18         |
| High School                                   | -0.15    | 0.42 | 0.86  | 0.13 | 0.722                | -0.97        | 0.67         |
| Difficulty Paying for Basics <sup>c</sup>     | -0.47    | 0.22 | 0.63  | 4.31 | <b>0.038</b>         | -0.91        | -0.03        |
| Gender × Race                                 | 1.16     | 0.87 | 3.19  | 1.80 | 0.180                | -0.54        | 2.86         |
| Race × Basics                                 | 0.80     | 0.33 | 2.23  | 6.03 | <b>0.014</b>         | 0.16         | 1.44         |
| <b>Health</b>                                 |          |      |       |      |                      |              |              |
| Functional Difficulty                         | -0.07    | 0.36 | 0.93  | 0.03 | 0.853                | -0.76        | 0.63         |
| Depression <sup>d</sup> (CES-D 16)            |          |      |       |      |                      |              |              |
| CES-D < 16                                    | 0.90     | 0.37 | 2.46  | 6.04 | <b>0.014</b>         | 0.18         | 1.62         |
| <b>Compensatory Strategy Use</b>              |          |      |       |      |                      |              |              |
|   | 1.11     | 0.38 | 3.02  | 8.47 | <b>0.004</b>         | 0.36         | 1.85         |
| <b>Social Support</b>                         |          |      |       |      |                      |              |              |
|   | 0.01     | 0.03 | 1.01  | 0.18 | 0.670                | -0.05        | 0.07         |
| <b>Model Fit</b>                              |          |      |       |      |                      |              |              |
| Final -2Log Likelihood                        | 282.49   |      |       |      |                      |              |              |
| Model $\chi^2$ /df                            | 39.34/13 |      |       |      |                      |              |              |
| Significance                                  | 0.001    |      |       |      |                      |              |              |
| Nagelkerke Pseudo R <sup>2</sup>              | 0.26     |      |       |      |                      |              |              |

<sup>f</sup> Items in parentheses indicate reference category.

<sup>\*</sup> Items in bold indicate significance.



- <sup>a</sup> Recoded into a dichotomous variable: white/non-white.
  - <sup>b</sup> Coded as a dichotomous variable: living alone/living with others.
  - <sup>c</sup> Rated from 1= not difficult at all to 4 = very difficult.
  - <sup>d</sup> Coded as a dichotomous variable: CES-D < 16/CES-D > 16.
- CES-D = Center for Epidemiologic Studies Depression scale.

**Table 4**  
**Frequency (%) of participants by initial and 6-month readiness status (N = 146) \***

| INITIAL READINESS LEVEL  | READINESS AT 6 MONTHS |               |             |                    |
|--------------------------|-----------------------|---------------|-------------|--------------------|
|                          | PRECONTEMPLATION      | CONTEMPLATION | PREPARATION | ACTION/MAINTENANCE |
| Precontemplation         | 0 (0%)                | 0 (0%)        | 0 (0%)      | 1 (0.7%)           |
| Contemplation            | 0 (0%)                | 6 (4.1%)      | 21 (14.4%)  | 17 (11.6%)         |
| Preparation              | 0 (0%)                | 1 (0.7%)      | 13 (8.9%)   | 44 (30.1%)         |
| Action/Maintenance       | 0 (0%)                | 0 (0%)        | 0 (0%)      | 43 (29.5%)         |
| <b>Total at 6 months</b> | <b>0</b>              | <b>7</b>      | <b>34</b>   | <b>105</b>         |

*Note:* Precontemplation and Contemplation are shown separately in the table for illustrative purposes, but were combined for all analyses.

\* This analysis includes those with readiness scores at initial and 6-month follow-up. Two participants from the original sample of 148 were excluded from this analysis because they dropped out of the intervention and thus are missing readiness values at the 6-month follow-up. One of those excluded was found to be in Contemplation and the second in Action/Maintenance at the initial session.

**Table 5**  
**Logistic regression: baseline factors predicting transition to action/maintenance readiness level at 6 months (N = 101)**

| CHARACTERISTIC <sup>†</sup>                   | b        | SE   | EXP(B) | WALD | P VALUE*     | LOWER 95% CI EXP (B) | UPPER 95% CI EXP (B) |
|---|----------|------|--------|------|--------------|----------------------|----------------------|
| <b>Demographic</b>                            |          |      |        |      |              |                      |                      |
| Age   | −0.08    | 0.05 | 0.92   | 3.46 | 0.063        | 0.84                 | 1.01                 |
| Gender (Female)                               |          |      |        |      |              |                      |                      |
| Male  | 0.78     | 0.59 | 2.19   | 1.76 | 0.185        | 0.69                 | 6.96                 |
| Race <sup>d</sup> (Non-white)                 |          |      |        |      |              |                      |                      |
| White   | −0.55    | 0.56 | 0.58   | 0.97 | 0.325        | 0.19                 | 1.73                 |
| Living Arrangement <sup>b</sup> (with Others) |          |      |        |      |              |                      |                      |
| Alone   | 0.76     | 0.57 | 2.15   | 1.80 | 0.180        | 0.70                 | 6.57                 |
| Education (>High School)                      |          |      |        |      |              |                      |                      |
| <High School                                  | −0.40    | 0.66 | 0.67   | 0.37 | 0.543        | 0.18                 | 2.44                 |
| High School                                   | −0.54    | 0.61 | 0.58   | 0.78 | 0.379        | 0.18                 | 1.94                 |
| Difficulty Paying for Basics <sup>c</sup>     | −0.03    | 0.26 | 0.97   | 0.02 | 0.898        | 0.59                 | 1.60                 |
| <b>Health</b>                                 |          |      |        |      |              |                      |                      |
| Functional Difficulty                         | −0.95    | 0.54 | 0.39   | 3.03 | 0.082        | 0.13                 | 1.13                 |
| Depression <sup>d</sup> (CES-D 16)            |          |      |        |      |              |                      |                      |
| CES-D < 16                                    | −0.39    | 0.55 | 0.68   | 0.49 | 0.485        | 0.23                 | 2.00                 |
| <b>Compensatory Strategy Use</b>              | 0.79     | 0.52 | 2.20   | 2.30 | 0.129        | 0.79                 | 6.07                 |
| <b>Social Support</b>                         | 0.11     | 0.04 | 1.11   | 6.14 | <b>0.013</b> | 1.02                 | 1.21                 |
| <b>Model Fit</b>                              |          |      |        |      |              |                      |                      |
| Final −2Log Likelihood                        | 106.38   |      |        |      |              |                      |                      |
| Model $\chi^2$ /df                            | 28.35/11 |      |        |      |              |                      |                      |
| Significance                                  | 0.003    |      |        |      |              |                      |                      |
| Nagelkerke Pseudo R <sup>2</sup>              | 0.33     |      |        |      |              |                      |                      |

*Note:* This analysis compares those participants who began in one of the pre-action categories and either maintained this status (N = 41) or moved to Action/Maintenance (N = 62). Those who began in Action/Maintenance and remained in Action/Maintenance at 6 months (N = 43) were excluded from the analysis. Two participants were later dropped because of missing treatment data: the first began in stage 2 readiness at the start of the intervention and advanced to stage 3 by end of the intervention (6 months); a second participant was found to be in stage 3 at the start of the intervention and at 6 months.

<sup>†</sup> Items in parentheses indicate reference category.

\* Items in bold indicate significance.

<sup>a</sup> Recoded into dichotomous variable: white/non-white.

<sup>b</sup> Coded as a dichotomous variable: living alone/living with others.

<sup>c</sup> Rated from 1 = not difficult at all to 4 = very difficult.

<sup>d</sup> Coded as a dichotomous variable: CES-D < 16/CES-D ≥ 16.  
CES-D = Center for Epidemiologic Studies Depression scale.