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Measuring the Contributions of Motives and Perceived Barriers to Active Aging

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Abstract

General motivation to be active and general perceived barriers to activity may help to explain the overall activity patterns of older persons in the second half of the life course. We report on a project designed to develop and refine measures of motivation and perceived barriers that can be used to examine the relationships between activity motivation, activity barriers, and several forms of actual activities. Four specific activities were considered: working, volunteering, exercising, and taking classes. An opportunity sample of 192 middle-aged and older persons from eastern Massachusetts responded to a questionnaire concerned with motivation, perceived barriers, and activities. Reliable measures of both general and activity-specific motivation and perceived barriers to activity were developed. The measures were examined for construct validity purposes. This analysis demonstrates that general activity motivation and perceived barriers are helpful in understanding patterns of activity among older people.

INTRODUCTION

The scholarly literatures on both successful aging and productive aging attach substantial importance to the engagement of elders in a variety of activities. In the successful aging paradigm, activity is expected to contribute positively to both physical health and psychological well being (Rowe & Kahn, 1998). Physical exercise, for example, is recognized as an important health promotion strategy (e.g., Glass et al., 1999). In the productive aging paradigm, older people make contributions to society through various types of activities, notably gainful employment, community service volunteering, informal assistance (usually within their families), and political participation (e.g., Morrow-Howell, Hinterlong, & Sherraden, 2001). In addition, participation in educational programs is frequently recognized as an important aspect of active aging (e.g., Caro & Bass, 1995).

What is less well established is what motivates older persons to remain physically, socially and productively active. It is even less certain how perceived barriers to activity are associated with engagement in a range of activities. Further, little research effort has been geared toward evaluating the impact of motivation and perceived barriers together. Thus, it is reasonable to ask the question: Is there a general, underlying motivation to be active in later life? Is there also a general indicator of perceived barriers? Or, as follows from the extant literature, are the motivations (and barriers) to engage in an activity specific to the activity in question?

The purpose of this study is primarily methodological; we explore whether underlying measures of motives and perceived barriers to activity engagement exist, both at the general level and as specific to a set of common activities expected to benefit both older persons and their communities. We also examine models of activity engagement with appropriate regression techniques to establish whether these motivation and perceived barrier measures have construct

validity. To accomplish these objectives, we constructed and administered an original survey to a convenience sample of middle-aged and older persons from eastern Massachusetts.

LITERATURE REVIEW

In studies of participation in activities, motivation, defined as personal interest or desire, has often been considered as one of a number of forces that may increase the likelihood of participation in an activity (Ajzen, 1991). Activity-specific barriers have been studied because of their potential to reduce the likelihood of participation in a specific activity. In survey research, perceived barriers have been used as proxies for actual barriers. Implicitly, research on motivation and perceived barriers is guided by the hypothesis that participation in an activity is most likely when motivation is high and barriers are low.

Some of the research on the reasons for the participation of older persons in activities has been based on the theory of planned behavior (Ajzen, 1991), which examines the links between social psychological forces and behavior. The theory of planned behavior is an improvement on an earlier perspective on the forces that motivate action, the theory of reasoned action. One of the significant advances provided in the theory of planned behavior is the idea that the link between subjective states and action must be considered within the context of constraints or barriers to activity. It is this acknowledgement of competing factors influencing action and inaction that underlies our concern with examining both motives and barriers to action.

Armitage & Conner (2001) provide a recent meta-analysis of research that draws on the extensive applications of this theory to explain behavior. Motivation encompasses important elements in the theory of planned behavior: behavioral beliefs and evaluations of behavioral outcomes influence the attitude toward the behavior which, in turn, is hypothesized to influence both behavioral intention and behavior. Similarly, barriers encompass control beliefs and perceived

power, which are hypothesized to influence perceived behavioral control which, in turn, is expected to influence behavioral intention and behavior.

Activities and Aging. Much of the literature on successful and productive aging focuses on personal characteristics of individuals as determinants of the types and amounts of activities in which they engage. For example, it is well established that participation is positively related to possessing at least fair health and having relatively few functional deficits. Higher socioeconomic status (measured commonly by education and income level) is also predictive of greater participation. Increasing age and having few social network contacts seem to limit the level of engagement in activities.

To investigate the potential interplay of general and specific measures of motivation and perceived barriers on activities of older people, we examine four types of activity: paid work, formal volunteering, exercising, and taking classes. The literature on paid work (employment) in later life, for example, is relatively well developed with attention to such topics as the extent to which older people work, employment motivation among older people, employment opportunities for older people, age discrimination in hiring, patterns of full-time and part-time employment, access to employment training, bridge jobs for those approaching retirement, and reemployment after retirement (e.g., Crown, 1996). Similarly, many studies have been conducted about volunteering among older people with attention to such topics as the extent of volunteering among older people (Fischer & Schaffer, 1993), motivation for volunteering (e.g., Omato, Snyder, & Martino, 2000; Okun, Barr, & Herzog, 1998), volunteer opportunities, and implications of volunteering for health (e.g., Baker et al. 2005; Li & Ferraro, 2005).

A number of studies have been conducted concerning the circumstances in which older people enroll in educational programs. Notable among these are books by Lowy and O'Connor

(1986) and Lamdin and Fugate (1997). The latter book reports on findings of a survey administered to elder learners that included questions on reasons for learning.

Physical exercise is widely recognized as an important element in health promotion for older people (e.g., Rowe & Kahn, 1998; Conn, Minor et al., 2003). Extensive professional interest in the topic has led to the introduction of a journal on the subject, *Journal of Aging & Physical Activity*. This is the one research area where both motivation and perceived barriers have received considerable research attention (Cohen, Marx, & Guralnik, 2003).

Taken together, each of these types of activities has been given considerable attention by sociologists, psychologists, experts in the field of exercise science, gerontologists, and others. However, to the best of our knowledge no research has evaluated the combined issues of motivation and barriers across more than one of these activities. This study contributes to the literature by developing measures of general motivation for activity and general barriers to activity, adapting existing measures of motivation and barriers for specific activities, and by examining the construct validity of these across social, physical, and productive activity types.

Research Objectives. Our research introduces the question of whether a general motivation to be active may help to explain overall activity levels, that is, cumulative activity across sectors of older individuals' lives and their participation in specific activities. Similarly, general perceived barriers to activity are introduced because these may negatively influence overall activity level and participation in specific activities. The report provided here represents one part of a stream of research about productive activity in later life stages on the part of the investigators. In previous work, we developed and tested a measure of motivation for active aging (anonymous citation). The previous study provided promising evidence that general activity motivation is related to but different from motivation for the specific forms of activity studied. Further, the data suggested that

general activity motivation helps to explain the number of types of volunteer work done by middle-aged and older persons beyond the effects of motivation to volunteer.

The current study builds on this earlier work by expanding our research agenda to include barriers to activities. In this study, we sidestep questions about the utility of distinguishing between general motivation to be active and motivation for *productive* activity alone. Gerontologists classify certain forms of activity as *productive* because they are judged to be socially valuable (e.g., Bass & Caro, 2001). Paid employment and formal volunteering are widely recognized as *productive* activities. In the case of employment, monetary payment for work is the recognition of valued effort. In the case of formal volunteering, some form of non-monetary public recognition is provided to demonstrate that the effort is appreciated. In other cases, the classification of an activity as productive is more complex because public recognition of value is less obvious, such as taking classes and exercising. We focus on the extent to which people desire to be active whether they or others classify the activity to be productive in ways in which economists or sociologists might classify the activity.

Thus, in this paper we report on the development of measures of general activity motivation and general perceived barriers to activity with a convenience sample of middle-aged and older persons. In addition, we report on preliminary use of the measures for construct validity purposes by examining the implications of the measures for a set of specific activities.

METHODS

Data for this study were collected through a self-administered survey of middle-aged and older persons using an opportunity sample of community-residing middle-aged and older persons in eastern Massachusetts in 2004. We used opportunity sampling to develop a research protocol that could be administered eventually to a representative sample. Although these data are not

representative of any known population, the data do provide the opportunity to test the survey instrument and to establish the utility of our measures of motivation and perceived barriers to activity in later life. A subset of the respondents for our sample was recruited from the learning in retirement program offered at a major university in Boston, Massachusetts, and from a group of older volunteers active on the campus. Persons attending senior centers in the Boston area were also included. The total sample size is 192. However, after deleting cases with missing values on some questionnaire items, the effective sample size for some analyses is reduced (see tables for specific sample sizes).

We developed and administered a survey questionnaire that included items expected to capture general motivation and perceived barriers to activity along with items regarding motivation for and barriers to engaging in paid work, exercise, volunteering, and taking classes (a copy of the survey instrument is available on request). We also included items to measure activity behavior in these same four areas along with respondents' socio-demographic and health characteristics. Paper versions of the survey questionnaire were distributed in classes and at senior centers. However, a subset of the respondents completed the survey via the internet (n=30). The internet version of the questionnaire was posted on the University web site. Participants in the University's learning in retirement program were encouraged to complete the questionnaires on line. The Massachusetts Chapter of AARP also publicized the online version on its web site. A logistic regression contrasting online respondents with conventional respondents revealed differences at the 10% level on two variables: age and education; online respondents tended to be younger and to have higher levels of education. Further evaluation of the use of internet surveys for this type of study is warranted but is beyond the scope of this particular study.

Respondent Characteristics. Respondent activities include paid work (part-time or full-time), formal volunteering, taking classes, and physical exercise on a regular and intensive basis (1=yes; survey question wording reported below). The following socio-demographic variables were also measured: age (years; range 50-94), gender (1=male), marital status (1=married), formal education (1=8th grade or less, 2=some high school but did not graduate, 3=high school graduate or GED, 4=Some college or two-year degree, 5=4-year college graduate, 6=More than 4-year college degree, self-rated health (1=poor, 2=fair, 3=good, 4=very good, 5=excellent), and automobile ownership (1=yes). In addition, activity limitation was determined with the question: “Do you have a condition that substantially limits one or more basic physical activities such as walking, climbing, reaching, lifting, or carrying?” (1=yes; question wording obtained from the Census Bureau, 2000 long-form questionnaire www.census.gov/dmd/www/pdf/d02p.pdf). Religiosity was measured with two questions: 1. “Do you consider yourself to be a religious person?” and 2. “How active are you as a member of a church, synagogue, or other religious group?” Both of these questions had the following response options: 0=Not at all, 1=Somewhat, 2=Large extent. An index was constructed by summing the two items (Range =0-4). We also collected information on race, but because only 14 respondents reported a race other than white, we do not include race in the analysis.

Respondent characteristics and activities are summarized in Table 1. Respondents reported participating extensively in our set of activities. More than 30% were employed either full-time or part-time. Over half (57.2%) were current volunteers for an organization (another 7% who were not active volunteers now had volunteered within the past year). Almost two-thirds (61.4%) reported exercising on a regular basis. (Exercising was defined for respondents as “regular exercise activity consisting of at least 20 minutes of continuous exercise two or three times per week for at least three months.) Over half had been enrolled in a class that had met at least five times in the past year. The

extensive participation in classes is not surprising in light of the fact that many respondents were recruited through classes.

[Table 1 about here]

The average age of respondents was 71. Approximately three quarters were women and slightly over one-third were married. The sample was relatively well educated with nearly two thirds reporting some education beyond high school. Slightly over one half of the respondents reported that they were in excellent or very good health. Slightly over one third reported a physical limitation such as walking, climbing, reaching, lifting, or carrying. Car ownership was reported by three-quarters of the respondents. The average score on the religiosity index was 2.0 (approximately a third reported being religious to a large extent, and nearly a quarter rated themselves as very active in church; data not shown).

Motivation and Perceived Barrier Measures. Items for the measure of general activity motivation were developed through focus group interviews with older persons (anonymous citation). The items for the general barrier measure were adapted from a variety of sources, including the Commonwealth Fund Productive Aging Study (Bass, 1995). The item pools for measures of motivation to exercise were drawn from Sechrist, Walker, & Pender (1987). The items for the measure of motivation to take classes were adapted from instruments used by Scala (1996), Lamdin & Fugate (1997), and Morrow-Howell, Kinnevy, & Mann (1999). The items for motivation to volunteer were drawn largely from the literature review by Fischer and Schaffer (1993); the work motivation items were drawn from a variety of sources including the Commonwealth Fund Productive Aging Study (see the appendix for the complete list of items). All of the items are deemed to have face validity.

In constructing our complex measures of motivation and perceived barriers, we sought to strike a balance between depth and efficiency. We sought to include sufficient items to reflect the underlying domain adequately; at the same time we sought summary measures that were relatively brief so that they could all be used in a single project without placing excessive burdens on respondents. We provide extensive discussion here on the measures of general activity motivation and general barriers to activity because these constructs are new to the literature.

For our measures of general activity motivation and general perceived barriers, we used principal component factor analysis to determine whether the constructs were best treated as multidimensional. This technique is exploratory and also allows us to maximize parsimony, including reducing the number of indicators to a manageable set. For specific activity motivation and specific activity perceived barrier measures, we sought to identify sets of items that measured single underlying dimensions. In one instance described below, we were not able to achieve a reliable summary measure for the entire item pool; however, we were successful when we identified two sub-indexes through factor analysis. We employed Cronbach's alpha to establish the reliability of our summary measures. As recommended by DeVellis (1991), we established .70 as a minimally acceptable alpha value for our summary measures. We dropped items when there was no loss in index reliability by doing so.

In developing summary measures, we dealt with missing values by assigning them the mean value for those who did respond. For each summary measure, we used scores for further analysis only when respondents had responded to at least 20% of the items. (We had encouraged respondents to rate all of the motivation and barrier items even when they did not appear to be applicable) Because some respondents skipped questions about activity domains in which they were inactive, the number of respondents varies for the analysis that is reported below. Items were scored

on a 1 to 5 metric from low to high. Summary scores were calculated by simple addition. The summary scores were all placed on a common metric by dividing the sum of the ratings by the number of items in the measure. This adjustment makes it possible to see where respondents typically placed themselves within the range of response options. This procedure also simplifies comparison of mean scores across measures since the measures differed with respect to the number of items included.

General Activity Motivation Measure. We worked with a pool of 13 items. The respondents were asked to rate from 1 to 5, with 1 = “Not important” and 5 = “Very important.” The items were preceded by the following question: “How important is it for you to....?” Item content was as follows: 1. Put your skills to use on a regular basis, 2. Keep a flexible schedule, 3. Contribute to the community, 4. Receive appreciation from other people for what you do, 5. Avoid taking on new responsibilities, 6. Be free to do the things that you enjoy, 7. Make new friends, 8. Do things at your own pace, 9. Have interesting new experiences, 10. Get out of the house regularly, 11. Choose the people with whom you associate, 12. Feel that you have accomplished something every day, and 13. Find ways to save money. The rotated factor loadings generated through a principal components factor analysis are reported in Table 2.

[Table 2 about here]

Three factors cumulatively accounted for 50% of the variance. The items that contributed most to the first factor were “do things at your own pace” and “be free to do things that you enjoy.” These items had been included to identify persons who attached no great urgency to activity. We named the first factor “discretion/enjoyment,” reflecting the fact that the full set of items that contributed to the factor shared an emphasis on discretion and enjoyment. The items that contributed most to the second factor were “Put your skills to use on a regular basis” and “Contribute to the

community.” We named this the “contribution/use” factor. Two items contributed most to the third factor, “Avoiding new responsibilities” and “Find ways to save money.” We expected that individuals with higher activity motivation would attach low importance to avoiding new responsibilities. A second item that contributed heavily to the third factor was “Find ways to save money.” Conceptually, we cannot explain why these two items fell into the same factor. For the analysis that is reported below, we used only the first two factors. We excluded the third because of our uncertainty about how to interpret that factor.

General Perceived Activity Barriers Measure. We worked with a 9-item pool to measure general perceived activity barriers. The items were preceded by the following question: “To what extent do the following describe your situation?” Item content was as follows: 1. My family encourages me to be active, 2. I feel better when I am active, 3. I spend a great deal of time dealing with my health care needs, 4. My family responsibilities take up a great deal of my time, 5. I do not like to go out at night, 6. I do not like to go out when it is raining, 7. I have difficulty in walking more than short distances, 8. I have major problems with transportation, 9. I frequently have very little energy. Respondents were given five choices ranging from 1 = “Not at all” to 5 = “Great Extent.”

Through principal components factor analysis, we identified a first factor that accounted for 35% of the variance and a second factor that contributed another 20%. The rotated factor loadings are reported in Table 3. The items that contributed most to the first factor were “I have major problems with transportation” and “I have difficulty in walking more than short distances.” We concluded that the first factor consists of a combination of health-and-transportation barriers, and we named this the “health/transportation” barriers factor. Several items contributed substantially to the second factor. Two of them involved family: “My family encourages me to be active” and “My

family responsibilities take up a great deal of my time.” The item “I feel better when I am active” also contributed a good deal to the second factor. Conceptually, it is not clear why the family-related items and the “feel better” item should be in the same factor. For the analysis that is reported below, we employed only the health/transportation factor. We excluded the second factor because of our uncertainties about what it measures.

[Table 3 about here]

Activity-Specific Motivation and Perceived Barrier Measures. Details regarding our measures of motivation for and barriers to engagement in work, volunteering, exercise, and taking classes are reported in the appendix. We report the size of the item pool for each index, the language employed to introduce each series of items, the mean item response, the standard deviation, and the correlation between the item and the summary score. The number of cases in the summary measures varies because of inconsistent responses to some sections of the questionnaire. Although we asked respondents to complete the entire questionnaire even if some sections did not seem to apply, some respondents skipped sections concerned with activities in which they were not active. For the summary scores, we report the mean and standard deviation on a scale of 1 to 5. We introduced the sets of questions about specific activities with a contextual statement that provided respondents with definitions of activities. We defined exercise as “activities that are strenuous enough to raise your heart rate and put your muscles to use.” We defined education as “classes that you might take for any reason at places like adult education programs.” We defined volunteering as assisting “an organization such as a church, hospital, or school.” Paid employment was defined as “working for pay, including both working for yourself or for someone else.”

In every case we were able to establish a usable summary measure. In all cases except for educational motivation, the summary measure was unidimensional. In the case of educational

motivation, we were unable to generate a satisfactory summary measure based on the entire item pool. However, a principal components factor analysis revealed two main factors. An examination of the item content suggested that they reflect the distinction made by Lowy and O'Conner (1986) between instrumental and expressive educational motivation. In the analysis reported below, we used both factor scores, one to represent instrumental education motivation and the other for expressive education motivation.

RESULTS

We examine the construct validity of our measures in two ways. First, we examine the statistical association among the motivation and barrier measures. If these measures capture both motivation for and perceived barriers to activity, then the set of motivation measures should be positively associated with one another and the set of perceived barriers should also be positively associated with one another. As well, the motivation and perceived barrier measures should be negatively associated. We use Spearman's Rho to establish the degree and direction of the association among our ordinal measures (see Table 4). In fact, most of the motivation measures were positively associated with one another. In most cases, Rho is significantly different from zero; statistical significance in non-random samples is less useful than in random samples, and thus, we view these only as suggestive of the strength of the associations. The association between the two general activity motivation scales is small and non-significant. This is to be expected under conditions where we believe these two measures are capturing different dimensions of motivation. Further, the discretion/enjoyment motivation factor association with health/transportation barriers is positive, small, and non-significant. The association between the contribution/use factor and health/transportation barrier is larger, positive, and in the expected negative direction (-.404). Of the

two general measures of activity motivation, the contribution/use motivation factor shows more consistent construct validity (compare columns 1 and 2).

It is not possible to discuss all of the other bivariate associations here, but some of the other relationships are worth noting. Particularly notable were relatively strong associations between the contribution/use motive and volunteer motivation (.326), the contribution/use motive and volunteer barriers (-.413), and work motivation and instrumental education motivation (.481). As expected, exercise barrier and exercise motivation were negatively, and strongly, associated (-.520). Note that the expressive education motive presents a more consistent level of construct validity than does the instrumental education motive when comparing the direction of relationships with other measures of motive and barrier (compare columns 4 and 5).

[Table 4 about here]

The perceived barrier measures were all positively associated with one another. All of the Rho coefficients were significantly greater than zero. Thus, the general and activity-specific activity barriers showed considerable construct validity. In sum, the results of this analysis demonstrate that the contribution/use motivation factor and the expressive education motivation factors have higher construct validity than the discretion/enjoyment motivation factor and the instrumental education factor, respectively. The other activity-specific measures of motivation and perceived barrier generally demonstrate a consistent pattern of construct validity. Both the general and activity-specific barrier indexes clearly provide the highest degree of construct validity.

As a second means of evaluating the measurement qualities of the motivation and perceived barrier indexes and scales, we estimated a series of regression models. These analyses are meant for heuristic purposes, and the models are not meant to be complete representations of more fully formed substantive frameworks that may be employed to predict the outcomes in question. We

concerned ourselves only with whether or not respondents were engaged in regular exercise, took classes, volunteered, or were gainfully employed. We also constructed a count of the four forms of activity as an indicator of scope of activity within the limited context of the activities reported herein.

Our analytic strategy was to use binomial and ordered logistic regression to determine whether motivation and perceived barriers were associated with specific types of activities and a count of activities, controlling for the influence of socio-demographic variables, current health and disability status, and automobile ownership. We used a hierarchical modeling approach. We began with regressions on activities that included only the two general activity motivation indexes and the general perceived barrier index. We then added activity-specific motivation and perceived barriers indexes to the models. Finally, we added the socio-demographic variables, health/disability, and automobile ownership characteristics. We limited our analysis to cases in which measures of specific motivation and perceived barriers were available.

Regression Results. We begin by discussing the results for paid work activity (see Table 5). In the first model, the contribution/use motivation index is positively related to the likelihood of working, and the health/transportation barrier index is negatively related to the likelihood of working. These three measures explain about 20% of the variance in the likelihood of working versus not working. After adding the activity-specific motivation and barrier indexes, the effect of the contribution/use index becomes statistically non-significant, but it is positive and larger than its standard error. For working activity and throughout the other three types of activity as well, the activity-specific indexes of motivation and barriers are clearly the strongest predictors of these behaviors. The full model of work activity shows that the contribution/use motivation index once

again becomes significant with the addition of this set of personal socio-demographic, health, and car ownership characteristics.

[Table 5 about here]

For the volunteer activity models, we see that the contribution/use motivation index is consistently positively and significantly associated with this behavior. Neither the discretion/enjoyment motivation index nor the health/transportation barrier index reaches statistical significance. When only the general motivation and perceived barrier indexes are included in the model, more than 14% of the variance in volunteering activity is explained (model 1).

In the exercise and taking-classes models, the general indexes of motivation and perceived barriers perform less well. In the exercise model, the health-and-transportation-barrier index is negatively and statistically associated with the likelihood of engaging in exercise, and alone these variables explain approximately 7% of the variance. In the taking-classes model, the health-and-transportation barrier is negatively associated with taking classes. In the expanded models, the general health-and-transportation-barrier variable is not associated with either taking classes or exercising. In the taking-classes models, the discretion/enjoyment motivation index reaches statistical significance (marginally) when activity-specific motivation and barrier indexes are included in the model and when the full set of variables is included. The general measures of perceived barriers index is negatively and significantly related to the likelihood of taking classes but the effect reduces to non-significance when other variables are added to the models.

As an indicator of scope of activity, we calculated a count of number of forms of activity in which respondents were engaged and regressed this ordinal measure first on the set of general activity motivation and barriers indexes and then on a full model with personal characteristics added using ordered logistic regression techniques (see Table 6). In the first model, the contributions/use

activity motivation index is positively related to the likelihood of reporting a greater number of activities, and the health/transportation barriers index is negatively related. These variables combine to explain more than 22% of the variance in number of activities reported. In the full model, the contributions/use activity motivation index remains statistically significant but the health/transportation barriers index is reduced to non-significance (although the direction of the effect remains negative and the estimate remains larger than its standard error).

[Table 6 about here]

DISCUSSION

Development of Measures. Our effort to develop a set of measures of activity motivations and barriers was successful; intriguing was the refinement of the measure of general activity motivation. Factor analysis yielded three potential measures with internally-consistent items but only two that we were able to interpret. The second factor, which we labeled “contribution/use” motivation, had item content more consistent with our concept of active aging; more importantly, the second measure achieved a high level of construct validity. This measure was consistently associated with other measures of motive and perceived barriers in the expected directions, and it performed very well in the specific activity-regression models. The first set of items, which we labeled “discretion/enjoyment” motivation, was the least likely of the three general measures to show construct validity in either the bivariate or multivariate analyses. The implication of the analysis is that general activity motivation is a multidimensional construct, but only a portion of this construct as measured here is related to the types of activities that we identified.

The fact that the third factor consisted largely of two seemingly unrelated concepts “avoiding responsibility” and “saving money” suggests more work in developing general activity motivation

measures is needed. It may be that willingness to accept responsibilities and its opposite, avoidance of responsibility, represent a distinct dimension that should be enlarged through the addition of more related items. Interest in saving money measures an economic motivation. Including more items focused on economic motivation may have enabled us to develop a general economic motivation measure that might be useful in explaining more than participation in gainful employment.

Our item pool for general activity barriers yielded a factor that consisted largely of health-and-transportation content. This index achieved an acceptable level of construct validity in our two types of analyses as well. It was consistently related to other measures of motives and barriers in the direction we anticipated. The measure also showed a negative and statistically significant relationship with engagement in work, exercise, and taking classes, as well as with the number of activities. The second barrier factor that was heavily influenced by two items concerned with family and two other seemingly unrelated items suggested that a broader conceptualization of general barriers might be useful. One possibility, for example, is that family obligations may be an obstacle to various activities outside the home.

With one exception, the development of measures of motivation for specific activities and specific barriers to activity unfolded smoothly. The exception was educational motivation. In that area we found two separate measures that reflect the distinction made by Lowy and O'Conner between instrumental and expressive motivation. For every specific motivation and specific barrier index, we achieved a Cronbach's alpha value of at least .77. We were also able to develop relatively concise measures; our longest measure is volunteer motivation consisting of eight items.

Survey Administration. It is worth noting that we were more successful in recruiting subjects for conventional survey administration than we were for an internet survey. We suspect two reasons for the disappointing response to the internet version of the survey. First, there may be a general

reluctance among some older people to complete computer-based surveys. Second, the length of the questionnaire probably discouraged potential internet respondents more than those who completed the paper version of the questionnaire. (Those who completed the paper version of the questionnaire at home had the option to interrupt their completion of the questionnaire.)

Substantive Findings. For each of the activity sectors we studied, we found that motives and barriers contributed to an understanding of behaviors. Consistently, these regression models explained a substantial amount of the variance. Motivation and barriers that were specific to activities had stronger explanatory power than measures of general activity contribution motivation and general perceived health/transportation barriers. The fact that general motivation and barrier indexes were not consistently associated with either exercise or taking classes is also noteworthy. It may be that general motives to be active are linked to some activities but not to others.

Our general activity contribution motivation measure was associated with the count of number of activities which served as a crude measure of overall activity. The general perceived health/transportation barrier measure was associated with the count of number of forms of activity only when it was included in the model without the other variables measuring characteristics of the respondents. A number of issues need to be considered. A measure of the total amount of time spent on activities might be a better measure. A better measure might also include forms of activity that were not studied here. In our previous work (anonymous citation), we found that general activity motivation was associated with the number of volunteering sectors in which respondents were engaged. In this study, we did not measure diversity in volunteer activity. A more adequate test of the explanatory power of the general activity motivation and barrier questions should include more sensitive measurers of diversity and overall scope of activities.

Our substantive findings need to be interpreted cautiously because our sample is not representative. Further, our sample is limited in size, although consistent with the sample size of other tests of the impact of motivation on certain types of activities. Our sample contains a disproportionate number of persons who take classes and volunteer because many of our respondents were recruited through classes or senior centers in which participants also contribute as volunteers. Nevertheless, the findings are intriguing and provide guidelines for ways in which motivation and barriers measures may be constructed and evaluated to help improve our understanding of which subjective factors either increase or decrease the likelihood of engaging in productive, social, and physical activity in middle-age and later life.

A limitation of cross-sectional research like that reported here is its inability to address the direction of causality in relationships between motivation and behavior. Our hypothesis is that motivation and perceived barriers influence behavior. An alternate possibility is that behavior influences motivation and reported barriers. In answering questions about motivation, respondents may be providing a rationale for their activities. In other words, participation in an activity may precede the rationale. The rationale or motivation may reinforce the activity, but the activity may not entirely be a product of the motivation. Similarly, reported barriers may be a justification or explanation for not engaging in an activity. The reported barriers may be incidental to the actual reasons for nonparticipation.

These questions about direction of causation can be addressed more adequately with longitudinal data. We hypothesize that among those who are not currently engaged in an activity, those who are more highly motivated to engage in that activity are more likely to engage in that activity at a later time than those who initially are less motivated. Similarly, among those who are

engaged in an activity at an initial measurement, those who report greater barriers are more likely to cease that activity than those who report fewer barriers.

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Table 1. Respondent Activities and Characteristics.

<u>Variables</u>	<u>%</u>
Paid Work (full or part-time)	30.7
Formal Volunteering (current)	57.2
Exercising (regularly and intensively)	61.4
Took Classes (within past year)	51.2
Age (mean/standard deviation)	71.0 (7.6)
Male	24.1
Married	38.6
Self-Rated Health (excellent or very good)	54.2
Activity Limits	35.5
Owns Car	75.3
Religiosity Index (mean/standard deviation)	2.0 (1.3)
Education (13 or more years; mean/standard deviation)	63.3

Notes: N=166.

Table 2. General Activity Motivation: Rotated Factor Loadings.

Question: “To what extent do the following describe your situation?”

<i>Item wording</i>	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>
Put your skills to use on a regular basis	0.004	-0.842	-0.037
Keep a flexible schedule	0.160	-0.677	0.237
Contribute to the community	-0.003	-0.733	-0.125
Receive appreciation from other people for what you do	0.257	-0.209	0.213
Avoid taking on new responsibilities	-0.069	0.172	0.763
Be free to do things that you enjoy	0.721	0.008	0.038
Make new friends	0.659	-0.200	0.023
Do things at your own pace	0.747	0.045	0.075
Have interesting new experiences	0.521	-0.451	-0.214
Get out of the house regularly	0.483	-0.364	0.109
Choose the people with whom you associate	0.601	-0.149	0.242
Feel that you have accomplished something every day	0.325	-0.572	0.333
Find ways to save money	0.252	-0.284	0.665

Table 3. General Activity Barriers: Rotated Factor Loadings.

Question: “To what extent do the following describe your situation?”

<u>Item wording</u>	<u>Factor 1</u>	<u>Factor 2</u>
My family encourages me to be active	0.066	0.758
I feel better when I am active	-0.221	0.787
I spend a lot of time dealing with my health care needs	0.639	0.444
My family responsibilities take up a great deal of my time	0.222	0.538
I do not like to go out at night	0.492	0.043
I do not like to go out when it is raining	0.688	0.056
I have difficulty walking more than short distances	0.842	-0.041
I have major problems with transportation	0.717	0.003
Frequently, I have very little energy	0.831	-0.124

Table 4. Bivariate Associations among Motivation and Perceived Barrier Measures: Spearman's Rho Coefficients.

	<u>Discretion/</u> <u>Enjoyment</u> <u>Motivation</u> (1)	<u>Contribution/</u> <u>Use</u> <u>Motivation</u> (2)	<u>Exercise</u> <u>Motivation</u> (3)	<u>Instrumental</u> <u>Education.</u> <u>Motivation</u> (4)	<u>Expressive</u> <u>Education</u> <u>Motivation</u> (5)	<u>Volunteer</u> <u>Motivation</u> (6)	<u>Work</u> <u>Motivation</u> (7)	<u>Health/</u> <u>Transit</u> <u>Barriers</u> (8)	<u>Exercise</u> <u>Barriers</u> (9)	<u>Education</u> <u>Barriers</u> (10)	<u>Volunteer</u> <u>Barriers</u> (11)	<u>Work</u> <u>Barriers</u> (12)
Discretion/ Enjoyment Motivation	1.00											
Contribution/Use Motivation	-.066	1.00										
Exercise Motivation	-.171†	.373*	1.00									
Instrumental Education Motivation	.164†	.027	.207*	1.00								
Expressive Education Motivation	-.319*	.267*	.401*	-.042	1.00							
Volunteer Motivation	-.035	.326*	.246*	.230*	.396*	1.00						
Work Motivation	.231*	.154	.122	.481*	-.173†	.104	1.00					
Health/ Transport Barriers	.129	-.404*	-.390*	.014	-.319*	-.073	-.126	1.00				
Exercise Barriers	.203*	-.183†	-.520*	.061	-.458*	-.166†	.156	.326*	1.00			
Education Barriers	.146	-.220*	-.303*	.258*	-.300*	-.030	.225*	.483*	.476*	1.00		
Volunteer Barriers	.051	-.413*	-.056	.218*	-.177†	-.210*	.201*	.221*	.239*	.330*	1.00	
Work Barriers	.265*	-.262*	-.007	.426*	-.315*	-.122	.319*	.353*	.266*	.396*	.503*	1.00

Notes: N=103; * $p \leq .05$; † $.10 \geq p \geq .05$.

Table 5. Hierarchical Logistic Regressions Predicting Work, Volunteering, Exercising, and Taking Classes.

Variables	<u>Working</u>			<u>Volunteer</u>			<u>Exercise</u>			<u>Take Classes</u>		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Discretion/Enjoyment Motive	.323 (.226)	.179 (.277)	.220 (.307)	-.074 (.194)	-.006 (.216)	-.077 (.243)	-.075 (.190)	.198 (.271)	.143 (.300)	.070 (.183)	.413† (.222)	.429† (.229)
Contribution/Use Motive	.770* (.285)	.487 (.349)	.875* (.423)	.954* (.228)	.566* (.266)	.600* (.296)	.366† (.197)	.214 (.287)	.217 (.314)	-.030 (.190)	-.188 (.214)	-.268 (.229)
Health/Transportation Barrier	-.674* (.264)	-.555† (.319)	-.487 (.457)	.279 (.221)	.266 (.244)	.168 (.347)	-.361† (.217)	.060 (.320)	.034 (.511)	-.604* (.217)	-.387 (.258)	-.325 (.351)
Activity-Specific Motive		1.719* (.361)	1.785* (.415)		1.058* (.249)	.991* (.275)		1.680* (.329)	1.927* (.378)		-.393† (.213)	-.275 (inst) (.235)
Activity-Specific Barrier		-.874* (.313)	-.929* (.391)		-.455† (.236)	-.646* (.276)		-1.191* (.325)	-1.334* (.406)		-.296 (.287)	-.225 (.304)
Age			-.022 (.052)			.054 (.036)			.017 (.042)			.046 (.032)
Male			-.226 (.699)			.785 (.561)			-1.667* (.740)			.598 (.513)
Married			.515 (.684)			-1.336* (.552)			1.352* (.681)			-.148 (.480)
Religiosity			-.532* (.242)			.315† (.188)			.028 (.211)			.048 (.156)
Self-Rated Health			.283 (.425)			-.738* (.362)			-.031 (.432)			.113 (.280)
Owns Car			-.967 (.944)			.126 (.636)			-.324 (.685)			-.431 (.532)
Education			-.259 (.252)			.017 (.179)			.304 (.231)			.140 (.165)
Activity Limitation			-.652 (.779)			.835 (.684)			.710 (.742)			.187 (.554)
Constant	6.040	1.346	3.732	-2.467	-5.427	-5.939	4.303	-3.869	-6.694	6.198	.959	-4.903
Pseudo-R ²	.203	.426	.470	.146	.296	.371	.074	.430	.471	.067	.195	.222
N	117	117	117	142	142	142	143	143	143	137	137	137

Notes: Log-likelihood coefficients and standard errors. * $p \leq .05$; † $.10 \geq p \geq .05$

Table 6. Hierarchical Ordered Logistical Regressions Predicting Number of Activities.

<u>Variables</u>	<u>Model 1</u>	<u>Model 2</u>
Discretion/Enjoyment Motivation	.142 (.154)	.170 (.159)
Contribution/Use Motivation	.690* (.168)	.624* (.173)
Health/Transportation Motivation	-.588* (.179)	-.266 (.243)
Age		.019 (.023)
Male		-.597 (.393)
Married		.137 (.344)
Religiosity		.066 (.118)
Self-Rated Health		.202 (.219)
Own Car		.437 (.401)
Education		.139 (.121)
Activity Limitation		-.361 (.417)
Intercept 1	-8.961	-2.985
Intercept 2	-6.709	-.615
Intercept 3	-4.910	1.244
Intercept 4	-3.243	2.957
Pseudo R ²	.229	.271

Notes: N=156. Log-likelihood coefficients and standard errors. * $p \leq .05$; † $.10 \geq p \geq .05$

**Appendix:
Activity Motivation and Barrier Measures**

General Activity Motivation (n=192) (13-item pool)

Question: "How important is it for you to....?"

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
Put your skills to use on a regular basis	4.2	1.1	.81
Keep a flexible schedule	4.0	1.0	.75
Contribute to the community	3.9	1.0	.73
Feel that you have accomplished something every day	4.1	1.0	.67
Total	4.1	0.8	
Alpha = .77			

General Activity Barriers (n=188) (9-item pool)

Question: "To what extent do the following describe your situation?"

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
I spend a lot of time dealing with my health care	2.9	1.2	.69
I do not like to go out when it is raining	2.3	1.4	.69
I have difficulty walking more than short distances	2.4	1.6	.87
I have major problems with transportation	1.8	1.4	.73
Frequently, I have very little energy	2.4	1.3	.81
Total	2.4	1.0	
Alpha = .82			

Exercise Motivation (n=183) (7-item pool)

Contextual statement: “The next set of questions is concerned with exercise. Exercise includes any activities that are strenuous enough to raise your heart rate and put your muscles to use.”

Question: “To what extent do the following describe your situation?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
Exercise helps me relax	4.1	1.1	0.90
Exercise increases my level of physical fitness	4.3	1.0	0.87
Exercise helps me to sleep better at night	4.0	1.1	0.87
I enjoy exercising	3.8	1.3	0.86
Total	4.1	1.0	
Alpha = .90			

Exercise Barriers (n=177) (6-item pool)

Question: “To what extent do each of the following affect your decision to exercise?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
I do not have time to exercise	2.3	1.3	.74
I feel embarrassed when other people see me	1.8	1.1	.79
Exercise clothing and equipment cost too much	2.1	1.4	.71
Regular exercise gets boring	2.5	1.4	.75
I get very tired when I exercise	2.3	1.3	.74
I am concerned about injuring myself when I	1.9	1.2	.69
Total	2.1	1.0	
Alpha = .83			

Education Motivation: Principal Components Factors (N=170)

Contextual statement: “The next set of questions is concerned with taking classes. We are interested in classes that you might take for any reason at places like adult education programs.”

Question: “How important are the following reasons for you to enroll in a class (on a subject of your choice)?”

	Expressive factor	Instrumental factor	Uniqueness
To help me with my current job or help in getting a new job	-0.087	0.812	0.334
To help me to be more effective as a volunteer	0.250	0.686	0.466
To help me pursue a new or long-standing interest or hobby	0.431	0.553	0.508
The joy of learning	0.801	0.063	0.354
To meet people with interests similar to mine	0.767	0.142	0.392
Assist me in searching for meaning and wisdom in my life	0.713	0.355	0.365
To help me engage in creative activity	0.757	0.322	0.324
To help me manage my personal affairs	0.353	0.690	0.400
To enable me to complete my education	0.264	0.654	0.503
To help me keep current	0.817	0.192	0.296
To keep my mind fresh	0.879	0.037	0.226

Educational Barriers (n=175) (6-item pool)

Question: “To what extent are each of the following items obstacles to your enrolling in classes?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
I am not aware of classes that interest me	2.0	1.3	0.75
It is hard for me to find a learning program that fits my schedule	2.2	1.4	0.76
The tuition and fees cost too much	2.7	1.6	0.78
I have hearing problems that make participation difficult	1.7	1.3	0.76
I have vision problems that make participation difficult	1.6	1.2	0.73
Total	2.1	1.0	

Alpha = .81

Volunteer Motivation (n=175) (8-item pool)

Contextual statement: “The next set of questions is concerned with volunteering for an organization such as a church, hospital, or school.”

Question: “To what extent do you agree with the following statements?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
Volunteering can enable me to do something for a cause that is important to me	4.1	1.2	0.80
Volunteering can be a way to give back	4.2	1.1	0.84
I enjoy the assignments that I can do as a volunteer	4.0	1.1	0.90
The volunteer assignments that are available to me are interesting	3.9	1.2	0.85
I am especially willing to volunteer when I can use my skills, talent, and experience.	4.2	1.1	0.82
Volunteering can be a good way to get valuable experience.	3.9	1.3	0.83
My religious beliefs encourage me to volunteer	3.3	1.5	0.65
Volunteering enables me to do things with friends	3.6	1.3	0.75
Total	3.9	1.0	

Alpha = .92

Volunteer Barriers (n=179) (7-item pool)

Question: “To what extent do each of the following limit your volunteering?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
Lack of information on how to become involved as a volunteer	2.0	1.3	0.81
My inability to make a year-round commitment as a volunteer	2.8	1.6	0.73
Lack of skills needed to be an effective volunteer	2.3	1.5	0.76
Lack of causes that I care to support as a volunteer	2.2	1.3	0.81
I believe that I should be paid for my efforts	1.9	1.2	0.68
I cannot afford the out-of-pocket costs of volunteering	2.2	1.4	0.74
Total	2.3	1.0	

Alpha = .85

Work Motivation (n=155) (5-item pool)

Contextual statement: “The following questions are concerned with working for pay, including both working for yourself or for someone else.”

Question: “To what extent do you agree with the following?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
I enjoy working	4.0	1.2	0.62
I want to work because I need the money	2.8	1.5	0.86
I want to work because I need health insurance coverage	2.2	1.5	0.77
Working enables me to save more for retirement	2.8	1.5	0.82
Working gives me self respect	3.6	1.4	0.70
Total	3.1	1.2	

Alpha = .81

Work Barriers (n=144) (7-item pool)

Question: “To what extent do you agree with the following?”

<i>Item wording</i>	Mean	Standard deviation	Item-total correlation
My skills are not in demand in the labor market	2.2	1.6	0.78
I do not like to get orders from a work supervisor	2.3	1.4	0.70
I have difficulty in finding a job that makes good use of my skills	2.4	1.6	0.85
The jobs that I can get do not pay enough to be worth my while	2.3	1.6	0.82
I don't have enough information about job opportunities	2.3	1.6	0.83
Total	2.3	1.0	

Alpha = .86