Assessing Motivation to Exercise in Frail and Older Adults

A common theme throughout almost all papers addressing exercise and older adults is the difficulty in defining frailty. It is understood to be a condition arising from a combination of factors including aging, disease, nutritional status, and functional ability. The reviewed authors take numerous approaches to establishing useful criteria for describing the condition. In his review of twenty-eight randomized controlled trials, Barreto notes that five of the studies used the “most utilized” definition of Fried et al. This definition, which makes a distinction between frailty and disability or comorbidity, included matching three of five possible criterion; low activity, weakness, slowness, shrinking, and poor endurance and energy (Barreto (2009) 75-76). Weiss et al. allude to the predictive validity of this same five-point definition, and elaborate on the functional decline of immunological, hormonal and neural systems involved with the condition.

Motivation Factors

In framing their discussion of disincentives to exercise in older adults, Hardy and Grogan cite the conclusions of Booth, Bauman and Owen’s 2002 study, which found gender differences in perceived barriers. Older women, the study found, tended to cite their age as a disincentive, while older men were concerned with injury and their health. Hardy and Grogan point out that this study did not provide for a free response on the question from subjects. Instead, subjects chose from provided lists of barriers, which, Hardy and Grogan posit, may have skewed the responses. Hardy and Grogan also summarize research around a number of other premises. Firstly, based on Lees, Clark, Nigg and Newman’s 2005 research, Hardy and Grogan cite the conclusion that current older adult exercisers perceive different barriers to activity (namely, time constraints and physical ailments) differently from non-exercisers (who cited fear of falling and negative aspect). Further, the research named variables, such as income, that influenced perceived barriers. Lack of motivation and time were found to be positively related to income, while illness, transport, and cost were negatively related. Hardy and Grogan also cite Lees’ 2005 research on the question of social support, including the concept that older women are more likely to exercise for the social interaction than older men, who more often are interested in the physical benefit. Interestingly, Hardy and Grogan also summarize research on the question of body esteem, a seemingly underestimated aspect of exercise motivation in older adults. While body dissatisfaction has been found to be a disincentive to exercise (Clarke, 2002; McLaren, Hardy, & Kuh, 2003 cited), Hardy and Grogan noted research that suggests (Janelli, 2004 cited) that perceived functional benefits are likely to be more prominent motivators (Hardy & Grogan (2009) 1037, 1043-1045).

This “chicken and egg” question of exercise motivation, whether a person’s frustration towards unsatisfactory aspects of their own condition, such as functional ability or body image, prompts or depresses activity, is addressed by Hardy and Grogan as well. They cite research on the interaction of self-efficacy theory (essentially, that people will persist at activities in which they perceive they are
successful) and older adult exercise. McAuley et al.’s 2007 study, Hardy and Grogan point out, found that positive self-efficacy was predictive of exercise activity up to five years after a subject was interviewed. Hardy and Grogan also note that exercisers and non-exercisers tended to view similar situations differently, with exercisers generally having a more positive perspective (Hardy & Grogan (2009) 1037, 1043-1044). Binder et al. point this out as a possible limitation of their longitudinal study. Subjects that exercised may have increased some measures, such as their SF-36 score, more because of the socialization than the actual physical exercise (Binder et al. (2002) 1925-1926).

Hardy and Grogan’s focus groups, working off of seven questions (reduced from twelve for time consideration, see Appendix A.), found several uncommon qualitative factors that were positively related to exercise in the subjects responses. Respondents described a feeling of “superiority” to younger generations, with regard to their own willingness to stay motivated and adapt to circumstances generally, and with regard to finding physical activities. Also, respondents described the motivation derived from others in two different ways. In some instances the respondents in a typical manner enjoyed companionship in overcoming social embarrassment and receiving support from others. In other cases, respondents indicated they stayed active to avoid the fate of others they knew personally that had become sedentary or succumbed to illness. Hardy and Grogan also cite the research of Stevens, Lemmink, van Heurden, de Jong and Rispens (2003), that indicates that social support is more predictive of exercise adherence if it specific to the activity, versus simply generalized support such as family infrastructure (Hardy & Grogan (2009) 1037, 1041-1043).

Hardy and Grogan also discovered some additional insights from their qualitative analysis. Older adults (predominantly white British females) interviewed mentioned that traveling at night was stressful, so being able to exercise during the day was preferable. Some respondents also discussed a perceived lack of understanding of their age-related concerns regarding the organization of exercise activities. Cost, schedule, public transport, and parking, as well as age-appropriate instruction, were all issues some felt were not addressed suitably to their needs. Additionally, many felt that flyers posted through the mail were most likely to reach them, given limited access or experience with the Internet (Hardy & Grogan (2009) 1037, 1044-1045).

Several authors reviewed mention that adherence and continuity of exercise activity by older adults is a complex behavioral subject, and is different from simply examining an individual’s perspective on starting an activity (Barreto (2009) 77). In their review of twenty-seven cross-sectional and fourteen longitudinal studies, Rhodes et al. describe several aspects of exercise adherence in older adults that have contributed to it being understudied. Firstly, in concurrence with Bareto, Rhodes et al. point out that adherence is a complex mix of individual and environmental factors. Additionally, they deem typical cross-sectional retrospective research design as inadequate to assessing directionality of relationships between variables. Causal and temporal variables that impede participants from continuing to exercise, they state, are better documented through prospective studies. As with Rockwood et al.’s concern with self-reporting bias (discussed herein under Motivation Metrics), Rhodes et al. mention that assessing motivation and adherence through self-reporting is of limited value. Additionally, Rhodes et al. concur with Bareto regarding the difficulty in establishing the “concurrent validity” of studies on older adult exercise adherence that use disparate scales for the same factors (Rhodes et al. (1999) 397-399).
Despite these reservations about making assumptions based upon many cross-sectional retrospective studies, Rhodes et al. offer several conclusions about older adult exercise adherence. In particular, they address a number of significant factors which influence motivation. Age and gender are primary factors, with men generally being more active than women, although the degree of this discrepancy varies by country. Also, two important factors are income and education. Both of these factors in retrospective studies are positively linked to both more regular exercise in middle age (itself positively associated with activity in old age) and rate of exercise. However, Rhodes et al. again pointed out that that prospective trials found much weaker linkages between these factors than retrospective studies, stating that this might be because of poor sample generalizability. Also, Rhodes et al. point out that motivation to exercise is not constant throughout life. For example, citing research by Gill & Overdorf, Rhodes et al. describe the variable focus found in women’s exercise motivation. Older women often sought the social aspect of activity, while younger women pursued positive body appearance (Rhodes et al. (1999) 397-401, 405-408).

Rhodes et al. also cite Emery et al.’s conclusion that physical condition was a key factor in adherence, with lower body limitation, mobility and illness being prime deterrents, especially in women. A number of psychological factors present in research are explored by Rhodes et al. The precursors of activity and adherence as described by Fishbein and Azjens Theory of Reasoned Action and extended Theory of Planned Behavior are assessed. The intention to act, and the reinforcement of that intention by various subjective norms, is expected to be a factor in older adults maintaining an exercise program. However, Rhodes et al. note research indicating subjective norms are actually less influential upon the young and the elderly. Instead, Rhodes et al. hone in upon another key influencer in continued activity. Social support, as noted by Hardy & Grogan, is of particular importance in adherence. It is a strong, but also problematic, source of motivation for older adults, inasmuch as the social structure surrounding an older individual often weakens over time. Additionally, the social structure outside the family is important to the activity, and kin is often the remaining structure available for many older adults. Ultimately, Rhodes et al. conclude that these non-family contacts are primary to adherence. They state, “As such, linking social interest with physical activity is the most successful approach to combat the negative association between the lack of social support and regular exercise.” The potential positive impact of healthcare providers in this capacity is often squandered Rhodes et al. state. Doctors often fail to adequately address the value of exercise in discussions with older adults, and fail to describe ways to approach activities (Rhodes et al. (1999) 401-405, 407).

Song et al. find a similar innate motivating factor in the social aspects of Korean dance, used as an activity in their six month study of seventy three older adults lining in South Korean residential facilities. The traditional forms of dance include hand holding and eye contact, as well as sing-alongs with folk tunes familiar to their age demographic. Song et al. speculate that these interactions are rare, and emotionally fulfilling to older adults who may be increasingly socially isolated. These social factors, Song et al. state, along with ease of access for residential dwellers, are likely contributors to the high rate of attendance (73.4%) in the four-times weekly dance sessions, compared to other studies considered (which ranged from 30 to 50%) (Song et al. (2004) 361-365).
The evaluation of psychological factors explored by Rhodes et al. is adapted by Tseng et al., who propose an intervention prototype (Appendix B.), which suggests strategies for motivating older adults regarding exercise. The intervention strategies are grouped by stages of change from the Transtheoretical Model, a behavioral change model. This model defines the five stages of change that an individual transits, both in progression and regression, on the path to starting and maintaining an activity such as exercise. The stages include pre-contemplation, contemplation, preparation, action, and maintenance. Tseng et al. advocate “stage-matched” intervention to reinforce the motivation of older adults (Tseng et al. (2003) 269-271, 273).

Motivation Metrics

One issue regarding age as a metric is the use of ranges. It is sometimes unclear why the ranges are employed, and what impact they may have on the distribution of individuals. It seems likely that a bucketing methodology that considers multiple variables might better describe the relative fitness or frailty of individuals. Rockwood et al. also cite a number of methods used in verifying their metrics, such as test-retest consistency (Rockwood et al. (2004) 1311). Similarly, the authors describe comparing the self-reporting rates of subjects on some activities to baselines from other studies, in order to assess potential social acceptability bias in their respondents (Rockwood et al. (2004) 1314). Also the authors consider the basic response rate to their study as part of extrapolating its relevance to the entire population. Rockwood et al. make a similar observation regarding the possible limitations in comparing “community-dwelling” older adults and the “true population” (Rockwood et al. (2004) 1311).

Rockwood et al. expand on the frailty metrics in their own previous work with a limited set of self-reported fitness measures. Subjects are rated as high, moderate, low, and no-exercise, based on the frequency and strenuousness of their exercise (high being exercise more vigorous than walking, more than three times a week). While these activity measures are deemed useful ‘surrogates’ to their existing frailty assessment procedure, the authors also identify several limitations. While the self-reported exercise measures do further define each subject, degree of exercise is a multidimensional condition that is not fully explored by the reporting procedure they have created. For instance, although follow up information on subjects’ vital status was collected five years after the initial assessment, the lack of change scores is cited as an omission that could offer more insight into the subjects’ state. The authors also point out that they did not assess the social support outside of the living community. Given that this support is predicted to be a key positive influence on exercise habits, the authors state, it would be useful to include as a measure. Additionally, a person’s perceived level of fitness can differ from their physical activity measure. The authors also make an interesting comparison between their evolving approach to measuring fitness and frailty and the ‘precision’ of physiological measures such as allostatic load (Rockwood et al. (2004) 1312, 1314-1315).

Rockwood et al. describe using a number of standardized examinations in pre-screening procedures. The 100-point Modified Mini-Mental State Exam is used, which consists of common physical and neuropysical clinical examinations, combined with standard patient history reviews. This exam is also used by Weiss et al. (Weiss et al. (2009) 288). Also, the Geriatric Status Scale is used to assess cognitive and functional measures related to frailty, on a mild to moderate to severe scale. In comparison, Binder et al. utilize a similar but more extensive set of standard scored tests in pre-screening assessments of
subjects physical and cognitive functioning. The Older American Resources and Services (OARS) instrument is used to assess how subjects use assistive technology or assistance in carrying out their daily routines. Aspects of that routine are defined as activities of daily living (ADL’s), and instrumental activities of daily living (IADL’s). Cognitive function and subjects outlook is further examined by Binder et al. using the Medical Outcomes Short Form (SF-36), the Short Blessed Test of Orientation, Memory, and Concentration, and the Geriatric Depression Scale (also used in Weiss et al.’s pre-screening procedures) (Weiss et al. (2010) 288). Binder et al. test the physical function of their subjects using a number of measures also. These include a medical history review, chest x-ray, blood and urine chemistries, and measurement of peak oxygen uptake (VO₂ peak). Also, Binder et al.’s subjects complete the Physical Function Subscale of the Functional Status Questionnaire, as well as a modified battery of exercises adapted from the research of Reuben at al. (the Modified Physical Performance Test, or MPPT). Balance, extension, range of motion, and single limb balance time are all assessed using standard medical methods and instruments, such as the Berg Balance instrument and Functional Reach test. Finally, subjects also completed a food diary under the direction of a registered dietician (Binder et al. (2002) 1921-1922).

Medication is often named explicitly as a pre-screening question. For example, Binder et al. asked about lipid–lowering medications, and excluded those on hormone replacement therapies (Binder et al. (2002) 1925-1926).

Weiss et al. utilize the Seated Step Test as a baseline examination in their research on the relationship of exercise capacity and frailty in 1,002 women, sixty-five and older, in Baltimore County. The examination, part of a battery of tests to assess pulmonary, cardiac, and muscular reserves, was performed after multi-step pre-screening to exclude those at risk. Participants engaged in four 3-minute exercise stages, involving stepping motions on and off a six-inch step, while seated and connected to several physiological monitors.

In his review of twenty-eight randomized control trials, Barreto writes that trials often deviate from current medical guidelines, or fail to define key aspects of the exercise regimes they study. This introduces the potential for stress or injury introduced by involving participants in a study procedure that is not compliant with the best medical practices that apply to exercise interventions for older adults. Additionally, Barreto states that this variation and ambiguity in exercise programs across studies makes broad comparisons and conclusions across studies harder to accomplish. Barreto indicates that recommendations on frequency, duration, and intensity of exercise from the American College of Sports Medicine and the American Heart Association would be useful, although not comprehensive, as sources for establishing baselines for exercise procedures. Barreto also describes the range of activities used in the twenty-eight studies he reviews. The majority used supervised training, while three used home-based training. Tai chi, resistance training, and skills and functional training were each used five times (Barreto (2009) 75-76).

Interestingly, Barreto also summarizes the main outcome variables in the twenty eight studies reviewed. Seventeen included physical and mobility measures, eleven included physiological measures, and seven of the twenty-eight including psychological or mental measures. In his discussion, Barreto also points
out that frailty caused by cognitive impairment is believed to be a different condition, and as such, studies must attempt to screen for these conditions, rather than compare different syndromes.

In reviewing the conclusions of the research described thus far, several themes clearly emerge. Many of the authors concur on the difficulty in citing a common definition of frailty which adequately describes the combination of factors and conditions involved. What is also clear from the research reviewed is that regular exercise is a powerful predictive indicator, as well as preventative practice, related to the various types of functional decline associated with frailty (Barreto (2009) 75-76).

However, several of the authors also note the additional complications in studying the interaction of exercise and the onset of frailty and other age-related health problems. Rockwood et al. discuss the inherent problems with accuracy in self-reporting studies, given the difficult emotions participants often have about explaining their exercise habits, health, and body image. Moreover, the authors note, establishing directionality in relationships between the numerous factors involved is challenging. Approaching this issue quantitatively is further complicated, Rockwood et al. state, because many studies on the subject are cross-sectional, when prospective data would better serve to fathom the causal interaction (Rockwood et al. (2004) 397-399). Barreto and Rhodes et al. elaborate on this point. Both state that establishing the “concurrent validity” of multiple studies on exercise motivation and adherence in older adults is complicated by different definitions and standards used to define physical and cognitive conditions and activities (Rhodes et al. (1999) 397-399).

Despite these issues, several conclusions regarding exercise motivation in older adults align in the research reviewed. Social support appears to be a key factor in adherence. However, not surprisingly, this factor is also more complicated than it might at first appear. Interestingly, Hardy & Grogan note that positive social support can either take the form of direct companionship and encouragement, or indirect motivation in the form of fear of joining peers whose health has declined (Hardy & Grogan (2009) 1041-1043). Rhodes et al. also point out that social support, while of clear importance, often diminishes as people age and their family and friend relationships fade, while non-family relationships in community facilities or with medical providers can still be influential. Specifically, Rhodes et al. lament that doctors too frequently omit describing the benefits of exercise to older adults (Rhodes et al. (1999) 401-405, 407).

Age and gender are also cited in several of the studies as key determinants of exercise adherence, with men being more active, and remaining so longer. However, Rhodes et al. note that these factors are multidimensional, and change may change substantially for an individual over time. For example, they point to evidence that the most prevalent exercise motivation for women changes from concern with body image in youth and middle age, to social interaction in older adulthood (Rhodes et al. (1999) 397-399, 405-408). This issue of body esteem as a source of motivation is also revealing. Hardy & Grogan note that the same concern with looking good can induce both satisfaction and frustration. While both emotions can motivate individuals to initiate exercise, adherence over time is linked to a both a positive self image and positive view of efficacy of exercise. Further, while the causality is uncertain, Hardy & Grogan assert that exercisers often report more positive views of situations, versus non-exercisers (Hardy & Grogan 1043-1044).
Finally, personal income emerges consistently as a positive factor in exercise adherence across these older adult studies. This is not surprising, given that income enables many other factors, such as education, transportation, quality community care, and access to healthcare, which are predictive of exercise adherence. While money may make means to exercise more accessible, it is revealing to consider Song et al.’s study, employing traditional Korean dance classes in older adult residential communities. The study found that key factors in older adults persisting in healthy exercise choices were simple and obvious. Participants enjoyed the company of their peers, in an activity that had familiar roots in their shared cultural experience, which they could easily travel on foot to join (Song et al. 2004) (361-365). While the multidimensional interaction of exercise participation factors may be difficult to define precisely, Song et al.’s procedure does offer a strikingly simple recipe for adherence. Significantly higher adherence levels appeared in the classes that offered social interaction that older adults valued, with low barriers to participation.
References


Appendix A.
Focus group questions employed by Hardy and Grogan (Hardy & Grogan, 2009, pp. 1038).

1. What are the benefits of exercise?
2. What barriers are preventing you from doing more physical activity? Is there anything you are afraid of? How could you overcome these barriers and fears?
3. How do you feel about the physical and mental aspects of ageing?
4. Do you feel that physical appearance such as weight and body size is less important as you get older?
5. Would you prefer to participate in group or individual exercise? Why?
6. Have you ever been told to increase your activity levels by a physician? If yes, what made you take/ignore the advice? If no, do you think being told to exercise by a doctor would make you do it and why?
7. Do you feel the Government/Council do enough to encourage older adults to be more active? What would you like to see in place?

Appendix B.
Tseng et al.’s Stage Matched Interventions for Older Persons to Promote Exercise Behavior (Tseng et al., 2003, pp.273)

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<thead>
<tr>
<th>Stages of change</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>Precontemplation</td>
<td>• Provide education about benefits of exercise and risks of chronic illnesses if not exercising (use of consciousness raising)</td>
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<td>• Watch videotapes or use role-play to demonstrate hazards of not exercising (use of dramatic relief)</td>
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<td>• Use imagery to portray self-image about not exercising, such as couch potato or laziness (use of self-reevaluation)</td>
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<td>• Have family/friends point out rationalizations for not exercising and discuss the problems (use of helping relationships)</td>
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<tr>
<td>Contemplation</td>
<td>• Provide education about the increased risk from chronic illness of not exercising to increase awareness of need to exercise (use of dramatic relief)</td>
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<td>• Provide information about locations of exercise classes and exercise equipment in community (use of social liberation)</td>
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<td></td>
<td>• Make a commitment to exercise that is shared with supportive family members/friends (use of self-liberation and helping relationships)</td>
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<td>• Explain circumstances that contribute to inactivity and alternative behaviors to overcome the circumstances (use of counterconditioning)</td>
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<td>• Set achievable exercise goals and rewards (use of reinforcement management)</td>
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<td>Preparation</td>
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<tr>
<td>• Provide exercise alternatives such as written exercise instructions, exercise videotapes or cassettes, individualized or group exercise (use of counterconditioning)</td>
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<tr>
<td>• Provide examples of problems in physical and social environment caused by not exercising, such as care burdens on family (use of environmental reevaluation)</td>
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<tr>
<td>• Use positive self statement that “I can exercise every day” several times a day (use of self-liberation)</td>
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<tr>
<td>• Put things around to remind about exercising (use of stimulus control)</td>
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