Functional Health: Innovations in Research on Physical Activity with Older Adults

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ABSTRACT

REJESKI, W. J., and L. R. BRAWLEY. Functional Health: Innovations in Research on Physical Activity with Older Adults. *Med. Sci. Sports Exerc*., Vol. 38, No. 1, pp. 93–99, 2006. **Purpose:** This symposium was structured to provide two keynote addresses and recent innovations on the topic of physical activity interventions. **Overview:** In the first paper, Drs. W. Jack Rejeski and Lawrence R. Brawley combine the content of their two keynotes into a single integrative review. This paper is then followed by four studies that build on and extend the research reviewed in their keynotes. The first is a study that examines the measurement properties of a scale designed to assess older adults' desire for physical competence. The second is an experiment that tests the efficacy of a brief intervention for increasing older adults' motives to attend educational sessions on physical activity in the context of assisted living. The third involves a pilot study in older adults that explores the feasibility and efficacy of using a group-mediated intervention for psychological empowerment in conjunction with more traditional methods of strength training. The fourth examines an innovative intervention that was designed to link the abilities acquired during strength training to older adults' performance of activities of daily living. **Conclusions:** Physical activity interventions should be designed to promote collaborative relationships between interventionists and participants. Older adults bring with them symptoms, emotions, motives, and beliefs that are as important to adherence and to the outcomes of interventions as the physical training regimen itself. Furthermore, from the perspective of both behavior change and physical training, the design of physical activity programs for older adults should pay close attention to intended objectives. **Key Words:** RANDOMIZED, CONTROLLED TRIALS, COGNITIVE-BEHAVIORAL INTERVENTIONS, ACTIVITIES OF DAILY LIVING, GERONTOLOGY

The number of older adults in North America will rise sharply over the next 30 yr. This demographic trend is the result of declining mortality rates, increasing life expectancy, and the aging of the baby boom generation. To illustrate, in the United States, mortality rates for persons aged 65–74 yr fell by 31% between 1950 and 1986, whereas in 1992, the typical older adult aged 70–75 could expect to live an additional 14.2 yr (National Center for Health Statistics, Trends in Health and Aging, www.cdc.gov/nchs, 1994). Although prolongation of life is an important public health goal, a more important one is the preservation of functional health: the ability to perform both basic and more advanced activities of daily living (ADL) (35). In fact, Fried and colleagues (15) characterized physical disability (decline in functional health) as a major adverse health outcome of aging and underscored the fact that "84% of persons 65 yr and older who are dependent (on others) in activities of daily living (ADL) or instrumental activities of daily living (IADL) live in the community."

Whereas a decline in functional health with aging is directly caused or aggravated by chronic health conditions such as heart failure, CHD, diabetes, and osteoarthritis (11,12), most older adults will live with, rather than die of, the disablement that accompanies chronic disease (32). In addition, the high rate of sedentary behavior that characterizes the older adult population (8) exacerbates impairments in physiological and structural systems that are typically observed with the aging process (7,34). In other words, it is important to emphasize to health professionals and the public that living a sedentary life into older age can lead to a loss of functional health due to the deficits in strength, endurance, and flexibility that are consistently related to *inactivity*. The old adage of "use it or lose it" is a key rule for maintaining physical independence as a person grows older.

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PHYSICAL TRAINING PROGRAMS

A solution to the problem of functional decline? It is widely acknowledged that various components of health-related fitness are central to the maintenance of functional health with aging. For example, sarcopenia (17), low MET capacity (1), and poor balance (20) contribute to the manifestation of functional limitations and are conceptualized as key *impairments* in models of the disablement process (36). In recent years, there has been a rapid increase in the number of investigations that have explored the merits of physical activity programs in maintaining or rehabilitating the functional health of older adults. Although results from short-term studies employing discrete tasks (functional limitations), such as a timed walk, are consistently positive, data concerning the benefits of physical training for improvement in functional tasks that are performed within the social context of daily living (physical disabilities) are inconclusive (18). Moreover, a well-known problem with preventive and rehabilitative exercise therapy programs for older adults is the challenge of maintaining long-term adherence (19).

More than a decade ago, researchers from the J. Paul Sticht Center on Aging and Rehabilitation at Wake Forest University instituted a systematic series of studies to investigate the merits of physical activity interventions in countering the loss of functional health among older adults due to various chronic diseases. Early research with the Fitness and Arthritis in Seniors Trial (FAST) ($N = 439$) (10) and the Reconditioning Exercise and Chronic Disease Trial (REACT) ($N = 151$) (5) demonstrated that exercise therapy was an effective intervention for the treatment of functional limitations in older adults whose health status was compromised by arthritis and chronic obstructive pulmonary disease (COPD), respectively. In fact, in an analysis of data from the Longitudinal Studies of Aging, Miller and colleagues (22) found that walking just a mile each week slowed the progression of functional limitations for men and women aged 70 yr and older. Moreover, in the FAST, older adults in either aerobic exercise or resistance training experienced improvements in their ability to perform basic ADL when compared to a health education control condition. This finding reflected some of the first evidence that physical activity may reverse physical disabilities as well as improve the performance at discrete tasks such as a timed walk (25).

Rethinking the design of physical training for functional health. One important lesson learned from these early trials was how little was known about the effective delivery of physical activity programs to older adults. For example, following the FAST, Rejeski and colleagues (28) examined change in performance-based self-efficacy beliefs and change in symptomatic knee pain as potential mediators of the exercise intervention effects on changes in functional performance. General linear models were employed to contrast the aerobic and resistance training groups with the health education control group. In preliminary models, it was found that the exercise interventions and each of the proposed mediators (i.e., self-efficacy and knee pain) were significantly related to residualized change in an 18-month timed stair climb. In the mediational analysis, baseline values for self-efficacy scores, knee pain, and functional performance were used as covariates. Upon entering the values for 18-month knee pain and self-efficacy scores into the model, both were independent predictors of the timed stair climb at 18 months, yet the effect for the intervention disappeared! In other words, change in patients' self-efficacy to perform the stair climb and changes in pain during the performance of functional tasks mediated the improved performance that occurred as a result of either aerobic or resistance exercise. The results of this investigation underscored the assertion that physical activity targeting functional outcomes should be grounded in theory that acknowledged the important role of social cognitive constructs in intervening on functional health outcomes (2,27).

Recently, another 18-month investigation, the Activity, Diet and Activity Promotion Trial (ADAPT), was completed in order to examine the independent and joint effects of diet and exercise on functional outcomes in older obese adults who had knee osteoarthritis ($N = 316$) (21). The study design was a full factorial, consisting of the following treatment conditions: health education control (C), exercise only (E), diet only (D), and a combination of diet and exercise (D+E). Study retention was excellent in all treatment conditions (>80%), and participants attended over 60% of scheduled intervention visits at the lifestyle facility. Over the course of the 18 months of treatment, the percentages of body weight reductions for the treatments were as follows: C = 1.8%, E = 2.6%, D = 5.7%, D+E = 4.4%. In one of the early publications from this trial, Rejeski and colleagues (30) demonstrated that the D+E treatment produced the largest change in satisfaction with physical function, an index of improvement in goal discrepancy between actual and desired physical self, across the 18 months of the trial. It was the combined group that also experienced the greatest change in self-reported physical health as measured by the SF-36.

A secondary aim of this same paper examined whether change in satisfaction with function and/or body pain mediated the effects of the pairwise comparison between the C and D+E interventions on the SF-36 physical health score. The analytic strategy first established that the change for both of these measures had significant bivariate relationships with change in the composite physical health scale, $r = 0.38$, $P < 0.01$ for satisfaction with physical function and $r = 0.65$, $P < 0.01$ for body pain, and that the group intervention effect was related to change in each of the proposed mediators ($P < 0.01$). Subsequent to meeting these criteria for a test of mediation (3), baseline and follow-up scores for measures of both satisfaction with function and body pain were added to the statistical model. As hypothesized, the previously significant treatment group effect became nonsignificant, $P = 0.96$, indicating full mediation. In this model, both satisfaction with function ($P < 0.0001$) and body pain ($P < 0.0001$) were independent mediators of follow-up scores on the SF-36 physical health index.

Physical training programs produce changes in specific physiological systems that lead to obvious changes in participants' ability to perform discrete tasks that are linked to the modality of training, for example, the ability to perform a timed walk with aerobic exercise or the ability to climb stairs after lower extremity strength training. However, this does not mean that older adults will generalize new skills that have been developed in a controlled environment to the performance of discrete tasks in different social contexts (what is called disability). This probably explains why the evidence for the beneficial effect of physical training programs on functional limitations is stronger than the evidence for physical disabilities (18). The idea that older adults' beliefs about their abilities and about their symptoms affect the way they react to exercise training is underscored by the data from the FAST. The clear implication is that physical training programs that target functional health outcomes must treat the participant as an active agent in the training regimen; that is to say, within the context of training, it is important to directly address beliefs and symptoms that influence the performance of physical tasks and the willingness to engage in exercise training. This point is revisited later in our discussion of a new study, the BESAFE trial.

GROUP-MEDIATED COGNITIVE-BEHAVIORAL INTERVENTIONS

Shaping active living in the elderly. In older adult populations, a recent innovation has been coupling group-mediated cognitive-behavioral (GMCB) interventions with physical training to directly target some of the issues raised above, that is, to directly intervene in motives, belief systems, and perceptions that influence different forms of adherence to training. The first randomized clinical trial that used this innovation was called Shaping Active Living in the Elderly (SALE) (6). The objective of this study was to address the concern that traditional exercise therapy does not provide sufficient (a) motivation, (b) instruction and practice in developing self-regulatory skills, or (c) abilities necessary to make the transition from center- to home-based activity that requires ongoing modification of daily lifestyle—in sum, to more directly address the issue of adherence. In this investigation, 60 older adults (mean age $\approx$ 70 yr) were pretested for physical activity, peak aerobic capacity, and health-related quality of life (HRQOL). They were then randomized to one of three groups: waitlist control (WLC), a standard physical activity program (SPA), or a GMCB intervention. The GMCB treatment condition was unique in that it met weekly for the first 3 months in a 30-min group setting following one of the center-based exercise sessions. These sessions specifically addressed cognitive-behavioral counseling and practice of skills to address (a) through (c) above. The common aspect of the SPA and GMCB interventions involved 6 months of combined center- and home-based activity. Contact with participants in both treatments was then terminated at the 6-month mark with a follow-up assessment at 9 months.

Results of the SALE trial revealed that, at the 9-month follow-up assessment, those individuals in the GMCB group had a higher frequency of weekly physical activity than those who had been in the SPA group. This was one of the first studies to provide evidence that the promotion of physical activity in older adults beyond the context of center-based instruction could be facilitated by integrating a group-mediated counseling intervention with exercise training. These findings were promising for promoting adherence and enhancing HRQOL for sedentary but healthy older adults. A key question was whether this model would lead to improved outcomes for older adults whose functional health was more compromised, specifically among individuals with chronic disease who had deficits in functional health.

The Cardiovascular Health and Activity Maintenance Program. Although it is well recognized that cardiac rehabilitation (CR) results in improvements to the functional health (e.g., cardiac function, HRQOL) of older adults, it is also well known that postprogram adherence to maintenance of lifestyle activity is a major problem. Furthermore, the positive effects of CR upon functional health may not be consistent across all participants (9). Clearly, there is a need for a different approach to behavior change that would take into account the interaction between the older adults' social context, the demands of exercise, and their perceptions to encourage better adherence and to promote long-term maintenance of health outcomes. The GMCB intervention employed in SALE provided the opportunity for older adults to test and practice strategies for managing lifestyle activity on their own while they still participated in the supervised rehabilitative setting. This "behavioral practice" not only included exercise but also attempts at the self-management of planning and scheduling, monitoring daily activity, setting goals, and finding solutions to overcome barriers to activity. The net effect places systematically increasing amounts of responsibility for independent exercise in the hands of the older adult, gradually "weaning" them toward managing activity in a self-sufficient fashion. These ideas were further tested in the context of a trial named the Cardiovascular Health and Activity Maintenance Program (CHAMP).

CHAMP (N = 147) was a randomized clinical trial that compared the effects of a traditional exercise program for CR with a GMCB intervention developed from social cognitive theory and principles of group dynamics. The treatment was targeted to physical activity and functional health outcomes among older adults with, or at risk of, cardiovascular disease. The study was 12 months in duration and included a 3-month intensive training phase, which consisted of 36 sessions across 3 months (the typical period of reimbursement for such programs), followed by a 6-month home-based phase where staff contact was faded to zero, and finally, a 3-month, no contact, follow-up phase. While both groups received standard CR exercise therapy during the intensive phase, the GMCB treatment arm also included postexercise group counseling sessions (26). While the GMCB intervention also had 36 overall sessions, the staff-participant contact was spread out over 9 months (26) fol-

lowing a gradually declining schedule during the home-based phase. Specifically, the GMCB intervention focused on participants' learning to develop a physically active lifestyle and the self-regulatory skills to carry out this lifestyle. The intensive phase of the GMCB intervention encouraged active participation and collaboration between participants and interventionists. It involved regular practice and mastery experience with self-regulatory skills. Finally, it included a planned "weaning" period in which participants used their learned self-regulatory and planning skills to develop and try their own home-based activity plans (e.g., plan for a day, plan for a week). Although the GMCB treatment involved a number of different cognitive and behavioral strategies, a central aspect of the intensive phase of this intervention was group-mediated problem-solving and behavioral homework. In summary, the GMCB activities were designed to cultivate the motivation for an improved functional health status, to increase participants' confidence in their ability to create and maintain an independent lifestyle of physical activity, and to adapt to any challenges that they encountered during the 3–12 months of home-based physical activity.

The results of CHAMP demonstrated that a GMCB approach to CR was superior to traditional CR in affecting all three major outcomes: MET capacity, recalled physical activity, and task self-efficacy for mobility. At 12 months, older adults in the GMBC treatment group reported 148-min of activity each week that was of moderate intensity or greater, had a mobility self-efficacy score (6-min walk) of 66.70, and had a MET capacity of 5.86; the traditional group reported 103-min of the same level of physical activity, had a self-efficacy mobility score of 60.94, and had a MET capacity of 5.49 (adjusted for baseline age and baseline value of the dependent variable). In order to examine whether improvements in their confidence to manage barriers to an independent lifestyle of activity were related to changes in the outcome measures, a self-regulatory-efficacy measure (i.e., barriers efficacy) was administered to GMBC participants. Residualized change scores (controlling for baseline) were created for both a barriers self-efficacy scale and each outcome measure. In the case of the barriers scale, change involved their 3-month postintensive phase scores minus their initial assessment scores. For each outcome measure, the change involved their final 12-month values minus their baseline prerandomization values. Correlational analyses revealed that positive changes in the ability to manage barriers within the GMCB group was related to positive 12-month change in both METs (0.52, $P < 0.002$) and self-reported minutes of physical activity (0.36, $P < 0.039$).

Although the CHAMP intervention resulted in promising treatment outcomes, *clear individual differences* also emerged. In the intensive phase of CHAMP, adherence was found to differ as a function of both treatment group and gender. Specifically, men had higher levels of adherence to the intervention than women, and older adults in the GMCB treatment had superior adherence compared to those in the CR treatment. When considering the overall 12-month trial, men had superior outcomes to women for all three major outcomes. These differences could not be attributed to sample selection bias because the randomized, controlled trial used a randomized block design with stratification by gender. As well, we found an *interaction* between individual differences and treatment for several outcomes (13). Specifically, men and women in the GMCB treatment group and men in standard CR exhibited more favorable changes in self-reported mental health status and vitality than women in standard CR. Also, the largest gains by men and women who benefited from the treatment were found among those older adults who had the lowest baseline scores.

The gender differences observed in CHAMP and the moderator effect of baseline mental health and gender on selective study outcomes underscore the need to pay specific attention to the way that social context, the demands of exercise, and the perceptions of the older adult affect responsiveness to treatment. While the standard care intervention was clearly successful in its own right, the GMCB approach offered promise for longer term maintenance of physical activity behavior. In addition, at the 3-month mark in CHAMP, when both groups had just completed intensive center-based training, we contrasted the effects of the two treatments on self-reported physical function. Results revealed that low functioning participants in the GMCB intervention experienced greater improvement in self-reported function than those in standard CR (31). It is important to note that improvement in physical function was an outcome stressed in the GMCB intervention as a motivational strategy for behavior change. In addition, group interactions inevitably involved discussions such as coping with the challenges of physical functioning and setting goals for increasing involvement in challenging ADL. Consistent with participants functioning as active agents in planning their increased activity, there was a superior adherence effect for the GMCB treatment. Both interventions emphasized that physical activity was important beyond the confines of the specific CR sessions. However, the GMCB participants focused on increasing their activity systematically most days of the week. This feature of CHAMP has since led us to applications of the GMCB model in tackling the challenges produced by physical disablement in older adults (29).

Behavioral Exercise Strategies for Alleviating Falls in the Elderly. Recently, the GMBC approach has been used to examine its viability in promoting behavioral change and adherence to address the problem of mobility disability and falls prevention. This research raises important questions about how to assess functional health and the type of training that may be required to address the problems that are being confronted by the older adult. In particular, a measurement challenge is that community mobility demands dynamic balance and gait to allow the older adult to adapt to changing environmental circumstances that arise during ADL (14) (i.e., going to the doctor, shopping). Current measures of balance and gait do not appear to capture these components of functional health. Furthermore, current training programs may not adequately challenge the dynamic nature of mobility and balance that is common to ADL.

The Behavioral Exercise Strategies for Alleviating Falls in the Elderly (BESAFE) trial consists of three treatment arms and will provide data relevant to these questions. The treatments include (a) a standard exercise program suitable for older adults, (b) a mobility challenge treatment program, and (c) a mobility challenge treatment program that also involves a GMCB intervention. The overall objective of BESAFE is to improve mobility performance for the purpose of falls prevention by addressing the known mobility and balance correlates (potential determinants) of falls and mobility disability. The initial sample consists of 74 older adults, aged 77 yr (SD ±6.6), who are apparently healthy but sedentary. Fifty-eight percent have multiple comorbidities and report some concern about balance in their daily life. In the intervention, older adults participate in a 3-month intensive training phase followed by a 3-month home-based phase. The GMBC component of the third treatment is similar to the previously described interventions, and staff contact is balanced across all conditions. The activity training in the mobility challenge conditions focuses on mobility and increasingly difficult aspects of dynamic gait and balance found in community mobility and is based on previous research by the investigators (14). Because mobility requires multiple biological systems, some appreciation of this uniqueness is important to understand the need for innovation in measurement and training.

The need for new approaches to assessing mobility. Community mobility is a function of a complex interaction between the learned skills and abilities of the older adult, the physical and mental demands imposed by the activity, and the challenges offered by the environment. Consequently, older adults must adjust to and cope with variations in terrain and lighting, moving obstacles such as other people or vehicles, and the requirements brought about by changing speed, increased fatigue, and perturbations in balance. As described by Frank and Patla (14), walking is "a controlled state of falling in which older adults are only one step away from disaster!" In an effort to cope with the problems of mobility disability (e.g., unsteady balance, reduced confidence in avoiding a stumble or fall), older adults attempt to adapt by adopting a decreased stride length and stiffer knee, which results in greater stability and prevents vertical collapse. However, these adaptations slow gait speed and consequently necessitate taking more time to be mobile in ADL. Such changes in physical function, depending on their magnitude, may be the source of disabilities.

The BESAFE trial was based, in part, on a mobility model proposed by Patla and Shumway-Cook (24). This model captures the subtleties/complexities of mobility that are ignored in standard measures of functional limitations (33) and includes eight dimensions that describe the interaction between the older adult and the environment during mobility. These include distance traversed, time constraints on mobility, ambient light conditions, terrain conditions, physical load interactions, attentional demands, postural transitions, and density of other traffic. The Dynamic Mobility Evaluation (DYME) measure is an assessment tool based on this model that consists of eight tasks, each scored from 0 (no function) to 4 (high function). A total score is then computed by summing scores across the eight tasks.

In the first study from BESAFE, the goal was to determine whether performance changes on the DYME are actually unique when compared to standard performance based measures of function. As a first step, one well-recognized indicant of mobility—change in gait speed—was used as a predictor of the change in DYME scores for all study participants across the first 12-wk intensive phase of the trial. In addition, changes in other measures, the Berg Balance test (4) and the short physical performance battery (SPPB) (16), were added to a hierarchical multiple regression procedure with age and baseline scores on all measures used as covariates. The multiple regression model was significant (model adjusted $R^2 = 0.38$, $P < 0.001$), with *change* in gait velocity during the intensive phase (indicant of dynamic mobility) accounting for 27% of the change in DYME scores, suggesting that the DYME is tapping more of the dynamic mobility construct. Moreover, additional analyses were conducted using change in 6-min walk time as the criterion variable, an outcome that does not have the ceiling effects of the SPPB and taps into endurance capacity. Is the change in the DYME a significant predictor of the change in the dynamic aspects of walking performance (i.e., 6-min walk) after accounting for covariate influence? The adjusted R^2 for this model was also significant (model adjusted $R^2 = 0.40$), with the DYME accounting for a unique 16% of the variance ($P < 0.0001$) in the change in the 6-min walk after controlling for baseline covariates (R^2 change of covariates was 0.25, $P < 0.001$). The DYME accounted for the largest variance in distance walked of any single predictor. Once again, it appears that a substantial component of performance on the DYME is unique from other measures. Consistent with the model of Verbrugge and Jette (36) of the disablement process, these data suggest that mobility disability is more complex than performance on discrete, less dynamic balance and gait tasks and reinforces the earlier distinction between measures of function, functional limitations and disability.

Mobility challenge training. The aforementioned analyses using the DYME and the conceptual model by Patla and Shumway-Cook (24) reinforce the scientific merit of evaluating the innovative potential of mobility challenge training. In short, a reasonable question to ask is whether standard exercise programs are the most advantageous form of physical activity training if the goal of an intervention is to prevent or reduce mobility disability (18). Training for balance and assessing it relative to mobility is important because dynamic balance is an essential part of mobility. However, the ability to adapt to changes in the environment needs to be a part of the physical activity training such that the interaction between person, environment, and mobility is challenged. In BESAFE mobility challenge training, multiple components of fitness were considered (i.e., strength training, stretching, and walking), and participants were exposed to graded situations that required increasing levels of challenge. The challenges involved multiple systems that influence balance and demand adaptation of the strategies

that an older adult uses to be mobile. Examples of the mobility training include the following:

- continuous walking with changing speeds
- pivots and turns to encourage direction change while walking
- practice the above while carrying variable weights as in the case of parcels or groceries
- practicing walking on uneven surfaces
- walking up and down low three-riser steps or ramps with turns or stairs with handrails
- practice the above while carrying variable weights as in the case of parcels, groceries, or small water jugs
- walking over and around stationary (pylons) or moving objects (other people)
- walking parallel but against the flow of walking traffic made by other people

Although these examples are discrete, they were incorporated into training sessions as older adults adjusted and adapted to their practice with the eventual progression resulting in a circuit-like training program. The interested reader is referred to Frank and Patla (14) for a more complete discussion of evidence-based recommendations for characteristics of tasks thought to encourage adaptable locomotion similar to challenges found in community mobility.

SUMMARY

This paper described lessons learned and several recent innovations from our clinical research programs on physical activity with older adults. Clearly, one of the major developments is the emphasis now placed on the collaborative experience between participants and interventionists. This collaboration recognizes that older adults bring with them symptoms, emotions, motives, and beliefs that are as important to adherence and the outcomes of training as the physical exercise itself. In most instances, interventions at our research centers now combine group-mediated counseling with physical activity training as a means of promoting motives and teaching self-regulatory skills that are essential to long-term program adherence. This group-mediated approach relies heavily on the use of specific behavioral experiences to practice concepts in real-world contexts and to validate positive changes in various targets of behavioral change. These same counseling sessions are used to assist older adults in understanding and coping with the symptoms and limitations imposed by physical disablement and chronic health conditions. Finally, these experiences with promoting physical activity in older adult populations have led to the development of improved measures of functional health and to a reanalysis of the very structure of what systems need to be challenged in the context of physical activity programming. Clearly, the demands placed on older adults to be mobile in real-world contexts require skills (both physical and psychological) not typically addressed in exercise training.

INNOVATIONS TO FOLLOW

The remainder of this symposium offers specific examples of several new and innovative directions that are currently under investigation. These innovations are relevant to future randomized clinical trials of physical activity with older adults and concern the interaction of the participant with their social environment and/or with the type of training used. The first paper begins by introducing a new concept to this area of research: desire for physical competence. The development of this measure has evolved from over a decade of research experience with social cognitive theory in the area of physical disablement with older adults. The desire for physical competence among older adults may vary as a function of health status and social stereotypes (23). To this end, the desire measure may be important in understanding and intervening on readiness for physical activity programming. Does the older adult desire to become more competent in areas of physical function that we are trying to improve? Failure to understand the answer to this question could stymie their efforts to attempt both exercise training and lifestyle change.

The second paper presents data on a brief functional feedback intervention that was designed to increase the motives of older adults in assisted-living facilities to attend information sessions on physical activity and physical disablement. This is an important study in that older adults who live in assisted-living facilities are sedentary and show little interest in physical activity programming. Additionally, a unique feature of this study is that, although participants had to consent to participate, they were initially identified on a random basis from four different facilities. Older adults frequently feel that their health and physical function is fine "for someone their age." Using formal assessment to inform older adults about their functional status relative to others their age may assist them in taking a first step to becoming knowledgeable about the need for exercise.

The third paper follows logically from our previous work on GMCB interventions and examines the added benefits of a psychological empowerment intervention when it is coupled with traditional strength training in older adults. Psychological empowerment is defined conceptually as a sense of personal competence, a desire for, and a willingness to take action (37). We have previously argued that intervening in motives and beliefs should be a priority in physical activity programs with older adults. This research provides a specific example of how these objectives can be achieved relative to a particularly important problem of aging—sarcopenia. By emphasizing a focus on the outcome of functional independence and gains in personal competence, can older adults be empowered to exercise regularly for strength gains?

The final paper also concerns strength training for older adults and an innovation that concerns intervening on the older adults' perceptions of the link between their resistance training and tasks they perform in everyday life (i.e., ADL such as ascending and descending stairs, opening heavy doors, opening jar lids). The intervention directly addresses

the interventionist's assumption that older adults make the connection that links strength change to greater confidence in the performance of ADL and the view that their ADL are easier because of training. Several studies indicate that this is not always the case. The paper by Martin Ginis and colleagues clearly shows that, regardless of the benefits of strength training alone, actively educating and working with participants on the ties between their training and ADL has real psychosocial benefits. This innovation directly underscores the necessity of collaborating with the participant rather than simply providing a well-intended exercise prescription.

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