**CENTENNIAL VISION**

Update on Geriatric Research in Productive Aging

Susan L. Murphy

**KEY WORDS**
- aging
- geriatrics
- human activities
- research
- treatment outcome

The American Occupational Therapy Association’s *Centennial Vision* articulates the strategic goals for the profession to be science driven and evidence based in major practice areas. In the practice area of productive aging, a previous review of research published in the *American Journal of Occupational Therapy* (AJOT) found mostly basic research with far fewer effectiveness studies. The current review article is divided into two parts. Part 1 provides an update on the types of research published on productive aging in AJOT in the past 2 yr (2009–2010). Part 2 examines the range and scope of occupational therapy effectiveness research on productive aging published in a similar time frame in other occupational therapy journals and outside of the discipline.


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The term *productive aging* has a long history. It is thought to be the precursor of *successful aging* (Rowe & Kahn, 1997), although successful aging appears to encompass a larger model involving the interplay among disease status, functioning, and engagement with life. (For an interesting discussion of how successful aging relates to productive aging, see Dillaway & Byrnes, 2009). The concept of productive aging was developed by Robert Butler, the founding director of the National Institute on Aging. Butler and Gleason (1985) stressed that older adults need to be productively engaged in society. *Productive aging* has been defined narrowly as the ability to serve or support the paid workforce (Caro, Bass, & Chen, 1993) and more broadly to...
include engagement in a variety of activities, such as volunteering, paid work, assisting in the family, maintaining self-care (Butler, 2002; Herzog, Kahn, Morgan, Jackson, & Antonucci, 1989), and continuing education (O’Reilly & Caro, 1994). This broader conceptualization is better aligned with occupational therapy, highlighting the importance of roles and activity engagement, whether the engagement has a direct societal contribution or whether it is individually meaningful and valuable. I considered articles on productive aging to include those describing activities pertaining to aging issues (e.g., driving, caregiving), an older adult sample (as opposed to samples with a particular condition or disability), and samples with a mean age of \( \geq 60 \) yr.

Part 1: Types of Productive Aging Research Articles Published in AJOT

Articles on productive aging published in AJOT from 2009 through 2010 were synthesized by type and level of evidence. Types of articles have previously been outlined (Gutman, 2008; Murphy, 2010) and include effectiveness studies, efficiency studies, systematic reviews, basic research, instrument development and testing, and the link between occupational engagement and health. The five levels of evidence (Lieberman & Scheer, 2002) are as follows:

- **Level I**—systematic reviews, meta-analyses, and randomized controlled trials (RCTs)
- **Level II**—two-group, nonrandomized studies (e.g., cohort, case control)
- **Level III**—one-group, nonrandomized studies
- **Level IV**—single-subject designs, descriptive studies, and case series
- **Level V**—case reports and expert opinion

In 2009–2010, 143 research articles were published in AJOT. Of those, 21 articles (15%) were classified as being on productive aging. Each productive aging article is classified by type in Table 1. Basic research articles and articles on instrument testing and development each made up 28% of the productive aging literature (Figure 1). Efficiency studies—that is, studies pertaining to client factors (e.g., safety, satisfaction), cost, or time efficiency—made up 19% of the articles. The remaining 25% of articles were in the areas of effectiveness (10%), topical area or professional question (10%), and the link between occupational engagement and health (5%).

Most of the productive aging literature from 2009 to 2010 pertained to driving (14 of 21 articles, or 67%). Driving articles made up all the efficiency studies and both studies examining a topical area or professional question. Five of the six instrument development studies and half of the basic research articles also pertained to driving. No driving articles were classified as effectiveness studies or as focusing on the link between occupational engagement and health.

Two productive aging studies (10%) were classified as effectiveness studies of an occupational therapy intervention: Murphy, Lyden, Smith, Dong, and Koliba (2010) provided Level I evidence, and Wang, Holliday, and Fernie (2009) provided Level V evidence. One was a pilot RCT that examined two versions of an occupational therapist–led activity pacing program (tailored and general) for symptom management for people with symptomatic knee or hip osteoarthritis. All participants wore a wrist accelerometer during a home period that measured physical activity and allowed for repeated assessment of pain and fatigue severity. Then, depending on group assignment, participants received general activity pacing instruction or tailored instruction on the basis of the relationship between the participant’s own physical activity patterns and symptoms taken from the accelerometer (Murphy et al., 2010). Compared with the general group, the tailored instruction group had lower fatigue levels on the Brief Fatigue Inventory at follow-up.

The other effectiveness article was a case study (Wang et al., 2009) in which the use of a specially equipped, anticollision power wheelchair was tested with a nursing home resident with dementia. Wang et al. (2009) found that the resident’s affect and indicators of social participation increased (e.g., alertness, smiling, engaging others). They also discussed challenges to long-term use of this wheelchair, such as the resident requiring a high degree of support to operate it.

The basic research articles that did not pertain to driving were on disparate topics, although all provided foundation for intervention development and can inform practice (Donovan & Cocroran, 2010; Perlmutter, Bhorade, Gordon, Hollingsworth, & Baum, 2010). For instance, Perlmutter et al. (2010) evaluated common conditions of older adults and participation as measured by the Activity Card Sort and found that decreased levels of vision, depression, and cognition were associated with lower participation. This study provides support for the importance of screening for these conditions and how their presence could guide treatment.
In my initial review of the productive aging literature (Murphy, 2010), I concluded that in light of the many basic research studies and few effectiveness studies, occupational therapy is still in the initial stages of supporting practice through evidence. Only one RCT was published in the 2008–2009 time period. For this review, I also found only one RCT. Although I found fewer basic research articles in this review than in the previous review and research in the area of driving is growing, effectiveness articles are still few and therefore limit the ability to use the evidence in practice.

### Part 2: Productive Aging Literature Published Outside of AJOT and the Occupational Therapy Field

Given the lack of effectiveness studies related to productive aging published in AJOT from 2009 to 2010, I was asked to examine the occupational therapy effectiveness literature on productive aging that has been published outside AJOT (i.e., in other occupational therapy journals and outside of occupational therapy). This search involved literature published from January 2009 through May 31, 2010.

I used several strategies in the attempt to perform a comprehensive search. In addition to searching several journals for occupational therapy effectiveness literature, I searched by author name to find research performed by specific occupational therapy researchers who conduct productive aging research. In addition, I polled

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<th>Author</th>
<th>Effectiveness Study/Level of Evidence</th>
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*Figure 1. Types of productive aging articles published in the American Journal of Occupational Therapy from 2009 to 2010.*
members of AOTA’s Ad Hoc Group on Aging for input on relevant journals and names of occupational therapy researchers.

I first examined occupational therapy journals (see the Appendix). An online search was performed using Medline, CINAHL, and full-text journal resources at my university. If abstracts were not available online, journals were manually searched. Journals outside of occupational therapy included the top 10 gerontology journals by impact factor (“Journals Ranked by Impact: Gerontology,” 2008) and additional journals thought to be relevant taken from resources from the Ad Hoc Group on Aging (see the online Appendix). In this online search, the search term was occupational therapy.

To search for occupational therapy researchers, I included all previous contributors to AJOT on the topic of productive aging, based on the previous geriatric research review article (Murphy, 2010). Second, a list of potential occupational therapy researchers on aging was generated; it included known researchers, chapter authors in occupational therapy publications on aging, and researchers from the American Occupational Therapy Foundation’s Academy of Research. Fifty-two names were generated, and a search was done on those names. Articles were included if they tested an intervention referred to as occupational therapy or if they were conducted by occupational therapists (determined from the author list or by credentials). Exclusion criteria were nonintervention studies; studies that discussed only design or methods of a trial or intervention study, case studies, and effectiveness studies that focused on a particular diagnosis or condition (e.g., stroke, traumatic brain injury, Parkinson’s disease, amputees) typically reflected in another practice area (e.g., rehabilitation, disability, participation). One effectiveness article was excluded because occupational therapy was given to all participants regardless of group assignment and was therefore not the intervention being tested (Gill, McBurney, & Schulz, 2009). Another article was excluded because its main focus was examination of the effect of intersection design on driving performance rather than application of an intervention (Classen, 2009).

Results
The initial search revealed 15 articles on occupational therapy effectiveness in occupational therapy journals other than AJOT and outside the field. On further classification, 3 of the 15 were determined to be efficacy studies (Bendixen, Levy, Olive, Kobb, & Mann, 2009; Gitlin, Winter, et al., 2009; Stefano, 2009), yielding 12 articles on effectiveness. Six articles (50%) were published in occupational therapy journals (Clemson et al., 2010; Greene, Sample, & Fruhauf, 2009; Hasegawa et al., 2010; Klassen, Liu, & Warren, 2009; Petersson, Kottern, Bergström, & Lilja, 2009; Stark, Landsbaum, Palmer, Somerville, & Morris 2009). Of the 6 articles, 2 were on home modification interventions, 2 were on pain management interventions, and 2 were on fall prevention. Two studies were RCTs (Clemson et al., 2010; Hasegawa et al., 2010). In non–occupational therapy journals, 6 occupational therapy effectiveness articles were published (Gitlin, Hauck, et al., 2009; Lam et al., 2010; Packer, Girdler, Boldy, Dhaliwal, & Crowley, 2009; Svidén, Furst, von Koch, & Borell, 2009; Wilson, Mitchell, Kemp, Adkins, & Mann, 2009). Three of the studies were RCTs (Gitlin, Hauck, et al., 2009; Lam et al., 2010; Wilson et al., 2009).

Table 2 shows the five RCTs yielded from this search. Two RCTs involved exercise training either to reduce falls (Clemson et al., 2010) or improve pain (Hasegawa et al., 2010). Two RCTs were on home modifications (Gitlin, Hauck, et al., 2009 Wilson et al., 2009). Gitlin, Hauck, and colleagues (2009) conducted an intervention that included behavioral instruction and task performance modifications, and Wilson and colleagues (2009) focused on assistive technology. Lam and colleagues (2010) examined a functional skills training program with people who had mild to moderate dementia.

Although the timespan for the synthesis of the effectiveness literature is relatively narrow (January 2009–March 31, 2010), a few main points are worth mentioning. First, it is apparent that researchers are applying core occupational therapy principles in unique and creative ways in interventions that will likely be important to translate into practice. Most of these RCTs are either done in home environments or consider environmental context for optimal translation. For example, Clemson and colleagues (2010) designed an exercise program built into daily routines to increase compliance and acceptability among older adults. Gitlin, Hauck, and colleagues (2009) have created a strong foundation of occupational therapy using a home-based program to prevent functional decline and mortality in a large RCT (n = 319).

Second, although all of these studies are considered Level I evidence, several were pilot in nature and used small sample sizes. In addition, the lack of detail in the procedure and analysis in some studies made an analysis of the evidence difficult. To build our knowledge base, specific details are necessary. Most studies had a Consolidated Standards of Reporting Trials diagram that depicted the flow of participants through the study. Fewer studies had information about randomization and treatment fidelity procedures, procedures for missing data, intent-to-treat analyses, and exact sample sizes for particular data analyses. In addition, reporting of effect sizes was not commonly done. Detailed reporting of these factors will allow a more rigorous evaluation of evidence and help occupational therapy build its evidence base.

Conclusions
Currently, AJOT’s publication of effectiveness literature on productive aging is lacking. Effectiveness literature was found when searching other occupational therapy journals and journals outside of occupational therapy; however, the review yielded only 12 studies, showing more broadly that evidence for occupational therapy’s effectiveness in productive aging is still lacking. Many studies were in disparate areas and do not provide consensus on which to base practice. In the area of driving, AJOT seems to be a central repository for occupational therapy literature, and occupational therapists appear to be defining their role in this area. Occupational therapist researchers in productive aging are also addressing important issues such as falls, functional difficulties, and pain management. It is possible that
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<th>Author/Year</th>
<th>Sample Selection Method</th>
<th>Sample Characteristics and Inclusion/Exclusion Criteria</th>
<th>Instruments/Interventions Used</th>
<th>Statistics Used</th>
<th>Results</th>
<th>Study Limitations</th>
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| Clemson et al. (2010)           | Recruited by mail from the Department of Veterans Affairs Home Front database and a list generated from a general medical practice. | Inclusion Criteria: Community dwelling, ≥ 70 yr, ≥ 2 falls, or ≥ 1 injurious fall in the past year, English speaking, independent ambulation  | Intervention: LiFE: 3 mo intervention—5 home visits, 2 booster sessions, follow-up phone calls; home-based, lifestyle integration of balance and strengthening exercises to reduce falls | Negative binomial regression Change scores from 0–3 mo, 3–6 mo, and 0–6 mo were analyzed with Mann–Whitney U tests | Significant reduction in falls in LiFE group at 6 mo follow-up Dynamic balance and self-efficacy improved | • No measure of long-term efficacy  
• Unequal rate of dropout (25% control participants vs. 6% LiFE group)  
• Potential contamination if control participants sought other programs |

| Gitlin, Hauck, et al. (2009)     | Recruited from urban community-living elderly people                                   | Inclusion Criteria: ≥ 70 yr with ≥ 1 functional difficulty, ambulatory, English speaking, and cognitively intact       | Intervention: Home-based program (ABLE) modifications to home environments and task performance; 6 mo active phase involving 5 90-min sessions with an OT, 1 90-min session with a PT; maintenance phase from 6 to 12 mo involved follow-up phone calls Control Group: No intervention provided | Main effects of treatment and risk level were analyzed with graphs of survival plotted using the Kaplan–Meier method and log rank tests of survival at 2, 3, and 4 yr | 24% of sample died from baseline to 4-year follow-up Mortality lower in intervention group than in control group at 3-yr follow-up | Analysis does not allow for multivariate risk adjustments or control of clinical variables. |

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| Hasegawa et al. (2010) | Community-dwelling older adults with knee joint pain | Inclusion Criteria: Older adults with knee joint pain | Intervention: 12-wk community-based training program of balance exercise and lower-body resistance exercise using body weight; sessions were 1×/wk for 80 min; 2 home sessions recommended and participants were asked to track compliance with home exercises | ANOVA and ANCOVA | Program contributed to significantly reducing knee joint pain, improving muscle strength and functional ability | • Small sample size  
• No ADL measures used  
• Lack of information provided on randomization procedure, how missing data were handled, and inclusion criteria such as how knee joint pain was defined or if there was an age criterion. |
| Lam et al. (2010) | Recruited from social centers and senior living centers in Hong Kong | Sample: Older adults with mild to moderate dementia (DSM–IV dementia 1 and 2) N = 74 | Based on interview, participants identified their ability to carry out daily tasks and their importance. Intervention group received functional skills training based on the principal investigator’s viewing of the questionnaire (tailored); the general group received skills training in tasks chosen randomly. Intervention and control groups were mixed for training to maintain OT blinding. 8-wk intervention; 45-min sessions with OT 2×/wk | Paired t tests and ANCOVA | After controlling for age, education, and medical comorbidities, no significant difference in motor or process skills, depression, or function between the groups | • Small sample size  
• Lack of a usual-care group  
• Lack of information on randomization and how intent-to-treat analyses were conducted  
• Unclear whether participants with dementia have adequate insight to rate their ability to carry out tasks which may weaken the effect of tailoring  
• Generalizable only to people with mild to moderate dementia |
Participants from a larger study were eligible if they reported a need for assistance in select areas or if they were deemed by a PT to have health issues that interfered with home responsibilities.

**Inclusion Criteria**
- Cognitively intact, had a disability such as spinal cord injury, postpolio, rheumatoid arthritis, or cerebral palsy, between ages 23 and 94, disability duration ≥3 yr, reported a need for equipment or devices or whether a PT determined that the person had pain, fatigue, or weakness that interfered with the ability to perform tasks.

**Sample**
- N = 91 (n = 47, intervention group; n = 44, comparison group), M ± SD = 62 ± 14.3 yr, % female = 75

**Intervention Group**
- Customized in-home evaluations of assistive technology, home modification, and task performance needs

**Comparison Group**
- Participants seen in their homes as above for functional assessment, but no devices were prescribed

**Instruments Used**
- Functional assessment outcomes (OARS) and FIM™
- Health care use and hours of in-home care determined through self-report by monthly phone calls from study team

**Analytical Approach**
- t tests and χ² analysis; repeated measures ANOVA
- Significant time effect for number of care hours received for both groups; significant decline in IADLs for both groups; Time × Group effect for FIM, suggesting slower rate of decline in intervention group

- Heterogeneous sample of disabled older adults; no control over whether comparison group sought assistive technology on their own; unblinded assessors
- Lack of information on whether there were dropouts and how missing data were handled.

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**Note.** ABC = Activities-Specific Balance Confidence Scale; ABLE = advancing better living for elders; ADL = activities of daily living; AJOT = American Journal of Occupational Therapy; AMPS = Assessment of Motor and Process Skills; ANOVA = analysis of variance; ANCOVA = analysis of covariance; DAD = Chinese Disability Assessment for Dementia; DSM–IV = Diagnostic and Statistical Manual of Mental Disorders (4th ed.); IADLs = instrumental activities of daily living; LIFE = lifestyle approach to reducing falls through exercise; M ± SD = mean age ± standard deviation; MESE = Marcus Exercise Self-Efficacy Scale; MFES = Modified Falls Efficacy Scale; OARS = Older Americans Resource and Service Instrument; OT = occupational therapist; PT = physical therapist; SF–36 = Short Form–36.
occupational therapists are working in multidisciplinary teams and contributing to multicomponent interventions that were not detected in my search because occupational therapy needed to be specifically mentioned in the article or represented in the researchers’ credentials. It will likely be important to clearly define the contribution of occupational therapy in interventions to delineate the unique role in a larger team.

Future Directions
Evidence building in productive aging is ongoing. Evidence in the area of driving has grown and may be a useful model for evidence building because occupational therapists are clearly defining their practice roles and publishing articles in a central place, a pattern that may facilitate advancements in research and provide access to information for clinical practice. The building of evidence may be more challenging in areas such as fall prevention, which often involve multicomponent interventions and investigators from various disciplines. To build and use evidence, it would be helpful if occupational therapists specified their unique contributions in multicomponent interventions. In addition, it will be important to have knowledge of and access to studies involving occupational therapy effectiveness that are published outside of occupational therapy, such as a central source that occupational therapy researchers and clinicians could use to access research. Last, evidence building in productive aging would be advanced by more resources such as funding for postdoctoral and other career development training as well as advanced training for researchers in intervention design, conduct, and dissemination.

Occupational therapy has numerous opportunities to contribute to productive aging. In the future and with adequate knowledge of the current research foundation, it will be possible for disparate research areas to converge and allow the creation of a strong body of evidence in productive aging. ▲

Acknowledgments
I thank the American Occupational Therapy Association’s Ad Hoc Group on Aging for providing insight into and feedback on searching for productive aging literature. I also thank Angela Lyden and Jessica Koliba for assistance in synthesizing the research evidence and Ethan Kolderman for his assistance in gathering information.

References


### Appendix. Occupational Therapy Journals Searched From 2009 to May 31, 2010

#### Journals Within Occupational Therapy
- American Journal of Occupational Therapy
- Australian Journal of Occupational Therapy
- British Journal of Occupational Therapy
- Canadian Journal of Occupational Therapy
- Indian Journal of Occupational Therapy
- Occupational Therapy in Health Care
- Occupational Therapy International
- OTJR: Occupation, Participation and Health
- Physical and Occupational Therapy in Geriatrics
- Scandinavian Journal of Occupational Therapy
- Journals Outside Occupational Therapy
- Age and Ageing
- Ageing and Society
- Aging and Mental Health
- American Journal of Geriatric Psychiatry
- American Journal of Health Behavior
- American Journal of Physical Medicine and Rehabilitation
- Archives of Physical Medicine and Rehabilitation
- Arthritis Care and Research
- Canadian Journal on Aging
- Disability and Rehabilitation
- Disability and Rehabilitation: Assistive Technology
- Gerontologist
- International Journal of Geriatric Psychiatry
- International Psychogeriatrics
- Journal of Aging and Health
- Journal of Aging and Physical Activity
- Journal of Allied Health
- Journal of the American Geriatrics Society
- Journals of Gerontology, Series A: Biological Sciences and Medical Sciences
- Journals of Gerontology, Series B: Psychological Sciences and Social Sciences
- Journal of Rehabilitation
- Journal of Rehabilitation Research and Development
- Psychology and Aging
- Topics in Geriatric Rehabilitation