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Evaluating Driving as a Valued Instrumental Activity of Daily Living

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KEY WORDS

- activities of daily living
- automobile driver examination
- clinical competence
- mental processes
- occupational therapy
- risk assessment

The purpose of this translational research article is to illustrate how general practice occupational therapists have the skills and knowledge to address driving as a valued occupation using an algorithm based on the *Occupational Therapy Practice Framework: Domain and Process* (2nd ed.; American Occupational Therapy Association, 2008b). Evidence to support the model is offered by a research study. Participants were compared on their performance of complex instrumental activities of daily living (IADLs) and a behind-the-wheel driving assessment. A significant relationship was found between the process skills from the performance assessment and whether the driver passed, failed, or needed restrictions as indicated by the behind-the-wheel assessment. The evidence suggests that occupational therapists using observational performance evaluation of IADLs can assist in determining who might be an at-risk driver. The algorithm addresses how driver rehabilitation specialists can be used most effectively and efficiently with general practice occupational therapy practitioners meeting the needs of senior drivers.

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Many Americans view driving as a right rather than as a privilege. Older adults, even those with declining health, resist giving up driving, although many do self-regulate their driving patterns by not driving at night, on highways, or during rush hour (Dellinger, Sehgal, Sleet, & Barrett-Connor, 2001). Studies have indicated that people who stop driving tend to have increased depression over time and have declines in psychological well-being (Fonda, Wallace, & Herzog, 2001; Marottoli et al., 1997; Ragland, Satariano, & MacLeod, 2005). Some research (Classen, 2008) has suggested that, for older adults at least, it is not driving per se that is so valued but the ability to get to the places they need and want to go. For young adults with an acquired physical disability, returning to driving is usually an explicit goal, frequently resulting in the adaptation of a vehicle to accommodate the physical impairment. For young people born with a significant physical disability, driving becomes a valued goal. Although driving a motor vehicle may not be feasible or financially viable, the idea of driving offers the opportunity to demonstrate independence in community mobility not otherwise achieved.

In the *Occupational Therapy Practice Framework: Domain and Process* (2nd ed.; American Occupational Therapy Association [AOTA], 2008b), community mobility, which includes driving, is one of the identified instrumental activities of daily living (IADLs) in the domain of practice. Thus, just as school systems attempt to place children with disabilities in the least restrictive environment possible, as occupational therapy practitioners, we must try to achieve the greatest amount of community mobility for our clients, including driving if it is safe for the client as well as the public.

Two levels of driving evaluations are used in practice: (1) screening and (2) full comprehensive driving evaluations. For older adults, self-screening

tools, such as the American Automobile Association's (2005) *Roadwise Review* and the *Driving Decisions Workbook* (Eby, Molnar, Shope, Vivoda, & Fordyce, 2003), can be used independent of the health care system. Driver licensing agencies, physicians, and other professionals also use screening tools, such as the Assessment of Driving-Related Skills (ADReS; Carr, 2010), which targets only the essential motor, visual, and cognitive functions for driving. Although screening tools are important for triggering the need for further evaluation, continued research is needed to determine their validity and reliability in real-world application (Dickerson et al., 2007).

A full comprehensive driving evaluation usually requires both a clinical portion and a behind-the-wheel (BTW) assessment to determine the client's driving capabilities. The clinical portion may take 1 or more hr and covers the various visual-perceptual, cognitive, and physical skills needed for driving. Unfortunately, although various measurement tools encompass the full range of key driving abilities, no single assessment or set of assessments is considered scientifically valid as a predictor of motor vehicle crashes. In fact, many people believe the BTW assessment is the gold standard for a final determination of pass or fail (Langford et al., 2008; Wheatley & Di Stefano, 2008). In the case of vehicle adaptations for physical problems, a BTW assessment is clearly essential and reveals whether the person with a disability has full control of the vehicle. For example, a person with a spinal cord injury needs to learn how to use hand controls instead of foot pedals. One could argue that the BTW assessment is the only essential assessment in such cases. Training and experience are needed before the person can "pass" the BTW assessment and the driving evaluator can feel confident that he or she is a competent and safe driver.

The problem is that driving is an overlearned skill set for adults with many years of driving experience. That is, patterns of behaviors are so well practiced that driving procedures and skills become automatic, not needing conscious attention as when a skill is first learned. Even people with moderate dementia may actually perform well on a BTW assessment in a familiar environment. The skills of staying between lane markings, stopping at red lights, and moving at appropriate speeds are all well practiced. It is when the unexpected event or problem occurs, requiring a quick decision and action, that the cognitively challenged driver may become unsafe. People with dementia may not always recognize their deficits and cannot make appropriate decisions to modify or cease driving because of their lack of insight, poor judgment, and loss of reasoning ability (Adler & Kuskowski, 2003). In fact, studies sug-

gest that up to 25% of older adults continue to drive after a physician recommends the cessation of driving (Dobbs, Carr, & Morris, 2002). Moreover, because of their disability, people with dementia cannot be retrained or have modifications made to the car to correct for their deficits, as can be done with a physical disability (Dickerson et al., 2007). Adults with dementia are at an increased risk for unsafe driving and crashes (Fox, Bowden, Bashford, & Smith, 1997), and studies have shown that people with dementia often become lost when driving (Rowe, Feinglass, & Wiss, 2004; Silverstein, Flaherty, & Tobin, 2002). Evidence supports elevating our response to warning signs of cognitive impairment: The consequences of getting lost for people with dementia have been shown to include injury or death (Hunt, Brown, & Gilman, 2010).

Recent statistics from the National Highway Traffic Safety Administration (NHTSA; 2007) indicate an 18% increase in the number of older drivers from 1996 to 2006 but only a 13% increase in the total number of licensed drivers, demonstrating a rising percentage of drivers > age 65. With increased longevity, we will continue to see an increase in the number of older drivers. Drivers \geq age 75 are involved in significantly more crashes per mile driven than their younger counterparts; by 2025, > 40% of all fatal crashes will be associated with age-related frailties (NHTSA, 2007). Moreover, the National Institutes of Health determined that 1 in 7 people older than age 71 have some type of dementia (Plassman et al., 2007). Thus, although older drivers are generally regarded as safe drivers (Insurance Institute for Highway Safety, 2008), clear evidence points to the need for appropriate screening and assessment tools for driving as well as qualified practitioners to implement evaluation, training, and rehabilitation services (Dickerson et al., 2007).

Specialists in driving rehabilitation (DRS), professionals with specialized skills and knowledge, perform comprehensive driving evaluations. Many DRS providers gain experience, pass an exam, and achieve the title of certified driver rehabilitation specialist (CDRS), which is recognized globally. Although most DRSs are occupational therapists, it is not a requirement for a CDRS or DRS. Many CDRSs have years of experience educating and training new drivers and adapting vehicles for people with physical impairments, and they have built a strong network with the Association of Driver Rehabilitation Specialists (ADED). Preliminary data in a recent study (Dickerson, 2009) indicate that DRSs without an occupational therapy degree tend to rely primarily on the BTW assessment and visual acuity screens, whereas DRSs

with an occupational therapy degree do comprehensive assessments covering cognition, perception, vision, and physical abilities.

As highly trained professionals, specialists in driving rehabilitation are few in number (ADED, 2008; AOTA, 2008a) and located primarily in urban locations across the country. The current numbers are inadequate to meet present and future needs as the Baby Boomers develop chronic conditions that will affect their ability to drive safely. This shortage may become acute if it is determined that BTW assessments are needed after a certain age to maintain licenses.

Driving rehabilitation is an emerging and dynamic field, and occupational therapy can play a unique and exciting role in its further development. The American Medical Association (Carr, 2010) has clearly delineated occupational therapists as experts who have the knowledge and skill set in this specialty area. Unfortunately, because driving is considered a privilege, evaluation of a person's driving ability has been classified by some insurers as nonmedical and is often not covered by private or public health insurance (Centers for Medicare and Medicaid Services, 2008). This barrier to the development of programs is significant for private practices or rehabilitation centers considering adding a driving rehabilitation program (AOTA, 2007). As evidenced by other areas of practice (e.g., mental health), however, unless the occupational therapy profession meets the need in this area, other professionals will quickly develop services to fill the growing demand. In addition to expanding driving evaluation and rehabilitation programs, general practice occupational therapy practitioners need to address the functional performance of their clients in relation to driving safety as they do with any other IADL.

The profession of occupational therapy is founded on the understanding that engaging in activities or tasks structures everyday life and contributes to individual health and well-being. Occupational therapy practitioners are skilled in the ability to assess areas of occupation and provide interventions to improve a client's functional performance in any or all of those areas. Community mobility is a critical IADL and is clearly included in the range of complex IADLs addressed in occupational therapy. From an occupational therapy perspective, the concern should be about mobility, whether it is as a pedestrian, passenger, transit user, or driver. It is under the framework of IADL and mobility that the question of driver safety must be addressed.

This article illustrates how general practice occupational therapy practitioners have the skills and knowledge to address driving when asked about the client's compe-

tence in this complex IADL. Occupational therapy practitioners are often asked to discriminate between people requiring assistance with their daily living tasks and those deemed safe to live independently in their home. The same performance components used to determine safety in the home—vision, perception, physical abilities, and cognitive abilities—can be applied to the activity of driving. Because driving is an IADL, occupational therapy practitioners should be able to accurately determine who is not at an elevated risk for unsafe driving, who should cease to drive until functional performance has improved, and who needs further evaluation by a specialist.

Although not the explicit purpose of this article, the study it describes provides evidence that an observation-based functional performance tool can be used to assist with the decision to cease or limit driving. The specific research question was, "Do those groups of participants who pass, fail, or need restrictions, as indicated by a DRS-administered BTW assessment, perform differently from each other on an occupational therapy IADL assessment?" To increase evidence-based support for the question, data were combined from two driving evaluation centers that used the same IADL assessment. This study used a quasi-experimental, multivariate group design.

Method

Participants

Participants for this study were a sample of convenience and included drivers from two centers on the East Coast of the United States. To be included in the study, participants had to be able to provide written informed consent and complete the BTW, clinical, and IADL assessments. Participants were excluded if they were novice drivers, needed hand controls or other adaptive equipment, or did not speak English.

Sixty-one participants consented to participate in this study. Three participants were unable to complete the Assessment of Motor and Process Skills (AMPS; Fisher, 2003), and 3 were unable to complete the on-road driving assessment. Of the remaining 55 participants, 84% came from one of the two centers. The sample had a mean age of 70.22 ± 14.35 , and 56% were women. Eighty-one percent ($n = 45$) of participants were White, 15% ($n = 8$) were African-American, and 4% ($n = 2$) were other or unknown. Participants had a wide range of diagnoses: 22 had neurological disorders (e.g., cardiovascular accident, traumatic brain injury), 5 had cognitive issues or dementia, and 13 were considered healthy community-living older adults. Eleven participants had either unknown diagnoses

or were one of a very few participants with a given diagnosis (e.g., 3 with cardiac issues, 1 with arthritis). The study was approved by the institutional review boards at both centers.

Instruments

The in-clinic assessments were typical tools used by occupational therapy practitioners performing driving evaluations. Although the assessments varied between the two centers, they covered functional mobility, reaction time, visual acuity, depth perception, color discrimination, contrast sensitivity, road signs, field of view, and cognitive tests. The results of the assessments are not addressed in this article.

The AMPS was used to evaluate each participant's IADL abilities. The AMPS consists of two scales, motor and process, and is designed for observation of performance within the context of doing everyday activities that are familiar and practiced, evaluating the quality of each specific action performed (Kottorp, Bernspång, & Fisher, 2003). *Process skills* are observable actions that a person uses to manage and modify actions to complete a task (AOTA, 2008b; Fisher, 2003). *Motor skills* are observable actions a person uses to move himself or herself or task objects in the environment (Fisher, 2003). The AMPS scales are based on the Rasch measurement model (Wright & Masters, 1982) and offer specific motor and process scores in the form of logit scores as a result of two scored task observations. The AMPS has been shown to be a valid assessment that demonstrates differences in motor and process ability between samples of people with and without disabilities (Bernspång & Fisher, 1995; Cooke, Fisher, Mayberry, & Oakley, 2000; Doble, Fisk, Fisher, Ritvo, & Murray, 1994) as well as a sensitive tool for community-living well older adults (Dickerson & Fisher, 1993, 1997). It has also been shown to be valid across cultures, gender, and diagnoses (Dickerson & Fisher, 1995; Duran & Fisher, 1996; Goto, Fisher, & Mayberry, 1996; Hartman, Fisher, & Duran, 1999). The validity, reliability, and stability of the measurement model of the AMPS are discussed elsewhere (Bernspång, 1999; Fisher, 2003). In this study, the AMPS motor and process scores represent the continuous outcome variables for the analysis.

The BTW assessment included a driving route starting in a protected environment, such as a parking lot, and progressed to a quiet neighborhood, city driving with increasing traffic and turns, and highway driving. It was administered by an occupational therapy DRS and scored

as *passed*, *restricted*, or *failed*. For this study, the BTW category represents the grouping variable for the analysis.

Procedure

The two facilities that collected the data are established driving programs in regional hospitals in North Carolina and Vermont. The study spanned 24 mo. Participants completed a BTW assessment and an in-clinic component.

Four experienced occupational therapists—DRSs from the two centers—completed the BTW assessments. The vehicle used at both sites was a midsize car with a dual braking system. At each center, the BTW driving route was the same for each participant. When the in-clinic or BTW testing indicated that the driver might be unsafe, the BTW evaluator eliminated highway driving at the end or did not progress into city traffic and recommended restriction or failure. All in-clinic evaluations were completed before the BTW assessment; because of scheduling, however, the AMPS was completed separately, either after or before the BTW. In all but one case, the occupational therapist who completed the IADL assessment with participants did not complete the BTW or in-clinic assessments with the same participants. The four occupational therapists who evaluated the clients on the IADL tasks were all certified AMPS raters. After all of a participant's assessments were completed, the BTW driving evaluator summarized the results and recommendations to the participant and family, if appropriate.

Data Analysis

Multivariate analysis of covariance (MANCOVA) was used to examine the data. Multivariate analysis allows the researcher to examine the effect of a categorical variable (on-road driving performance) on multiple dependent variables (AMPS motor and AMPS process) while adjusting for a covariate. Univariate analysis was used to assess potential differences by center and gender along with the relationship between age and AMPS scores. The univariate, multivariate, and between-subjects effects were evaluated at $\alpha = .05$ for significance. Subsequent comparisons were conducted with a Bonferroni adjustment (Pedhazur, 1997) for multiple comparisons. Statistical Package for the Social Sciences (SPSS) Version 15.0 for Windows (SPSS, Inc., Chicago) was used for all statistical analyses.

Results

A total of 27 participants passed (49%), 14 were given restrictions (25.5%), and the remaining 14 (25.5%) failed the BTW assessment. To ensure that there was no

sampling bias, we examined differences in AMPS scores across the two data centers and found no significant difference (Motor: $t[53] = 0.61, p = .54$; Process: $t[53] = 0.16, p = .87$). Univariate analysis showed no significant relationship between age and AMPS scores or on-road driving assessment (Motor: $r = .04, p = .79$; Process: $r = .11, p = .42$). However, because significant differences in AMPS process scores by gender were found ($t[53] = 2.11, p = .04$), we adjusted for gender in the MANCOVA. Pearson's correlation confirmed a significant relation between motor and process scores when adjusting for gender ($r = .486, p < .01$). The MANCOVA included on-road driving assessment with three levels (pass, restricted, fail) as the independent variable, AMPS motor and AMPS process as the continuous dependent measures, and gender as the covariate.

Covariance and variance assumptions for the MANCOVA were tested and found to be tenable. The multivariate test of differences between groups with the Wilks' λ (Pedhazur, 1997) criterion was significant ($\lambda = 0.628, F[2, 51] = 6.537, p < .01$), indicating effects of on-road driving ability on AMPS scale scores even after adjusting for gender. Follow-up univariate comparisons, with a Bonferroni method to control for multiple comparisons, indicated that on-road driving had a significant effect on AMPS process scores ($F[2, 51] = 13.787, p < .01$) but not on AMPS motor scores.

The subsequent pairwise comparisons showed a significant mean difference between participants who passed and those who failed the BTW assessment (mean difference = 1.10, $p < .01$) as well as between those who were restricted and those who failed (mean difference = 1.035, $p = .01$). Figure 1 compares AMPS process scores across the three on-road driving groups.

Discussion

Because driving is an IADL within the domain of occupational therapy practice, practitioners should be able to accurately determine who is a safe driver, who is at risk for unsafe driving, and who needs further evaluation by a specialist. The results of this pilot study strongly support this position. Specifically, the AMPS process scale demonstrated a strong relationship with the results of the BTW assessment. The participants who scored higher on the process scale were more likely to pass the BTW assessment, the participants who scored the lowest were most likely to fail the BTW, and those who received restrictions were midrange in process scale scores. Figure 2 illustrates this finding, which positively supports the specific research question concerning whether people who pass, fail, or need restrictions, as indicated by a DRS-administered

BTW assessment, perform similarly on an occupational therapy IADL assessment (in this case, the AMPS). Figure 2 shows that we could speculate that people falling below 0.0 logits on the process scale would fail the BTW assessment and that people above 2.0 logits would pass the test.

The motor scale of the AMPS was not significant in differentiating between the groups, suggesting that process or cognitive abilities are more critical in determining whether a person can pass a BTW assessment. This finding is not surprising in that motor skills in the older adult population more likely lend themselves to self-regulation and spontaneous compensation than do the loss of important executive skills.

A significant difference in process scores was found between participants who passed and failed and between those with restrictions and those who failed. The implication is that people with the lowest process scale scores likely do not need a referral to a driving specialist to be told not to resume driving. Conversely, the observation by an occupational therapy practitioner who finds no issues with task performance during a complex IADL supports the premise that the person has no functional impairments that correlate with driving risk. This information can be communicated to the physician or team with the recommendation to resume driving without a referral to a specialist in driving rehabilitation. The implication is that the occupational therapy practitioner assessing a client completing a complex IADL observes whether the client can scan the environment, appropriately time and sequence two different tasks simultaneously, anticipate outcomes or steps, and modify their actions in a dynamic environment.

Evaluation of IADLs Includes Driving

Why have occupational therapy practitioners correlated their assessment of skills with other complex IADLs such as living alone or managing finances but stopped short of driving? The skills are the same as those used in operating a motor vehicle. If the client has difficulty with complex IADLs, the occupational therapy practitioner has the data to inform the team or client that the client may also have difficulty with driving. Depending on the timing and course of treatment, the occupational therapy practitioner can proceed with making appropriate recommendations to guide driving and community mobility needs and subsequent goals. As in many areas of practice, a clear respect for the hierarchy of evaluation and interventions must be maintained. When the skills or abilities to safely operate a motor vehicle are in question, the occupational therapy practitioner should initiate a referral while gauging

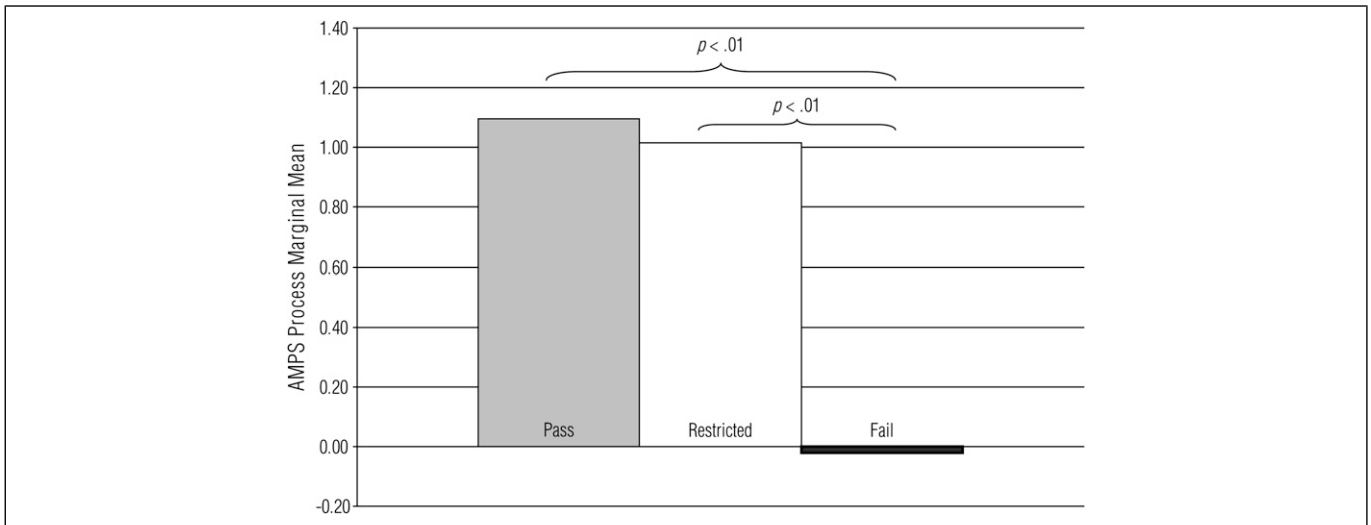


Figure 1. Graphic comparisons of the marginal means for Assessment of Motor and Process Skills (AMPS) process scores between on-road driving assessment groups. Pairwise analysis shows significant differences between participants who pass versus fail and between participants who were restricted versus failed.

the appropriate time for evaluation of driving competence or feasibility of driving rehabilitation interventions from a specialist with driving rehabilitation expertise.

Who administers driving evaluations depends on the setting, state, and training of the evaluators. Unfortunately, the services associated with the term *driving evaluation* are not consistent and, in fact, vary widely. Each state has a licensing authority that uses some level of driving evaluation for at least its novice drivers—usually a structured system resulting in either a pass or fail for new drivers who hope to be licensed. Few states have formal medical review boards, but national work is under way to increase this practice (Transportation Research Board, 2009). Medical review boards in states such as North Carolina may refer complex cases to DRSs, who

provide individualized comprehensive driving evaluations. The important point is that the services, resources, and consequences of these options are vastly different. Just as an eye exam's results should be interpreted differently depending on whether it is administered during a school's eye screening, by an optometrist, or by an ophthalmologist, the service called a *driving evaluation* can be administered with great variance. It is critical to understand the implications of each option for a driving evaluation, and the difference is not simply the cost. The problem is not the range of services but the lack of clarity. Not all clients need the services of DRS. The practitioner should be able to use results from their evaluations and intervention sessions to make the appropriate recommendations or referrals.

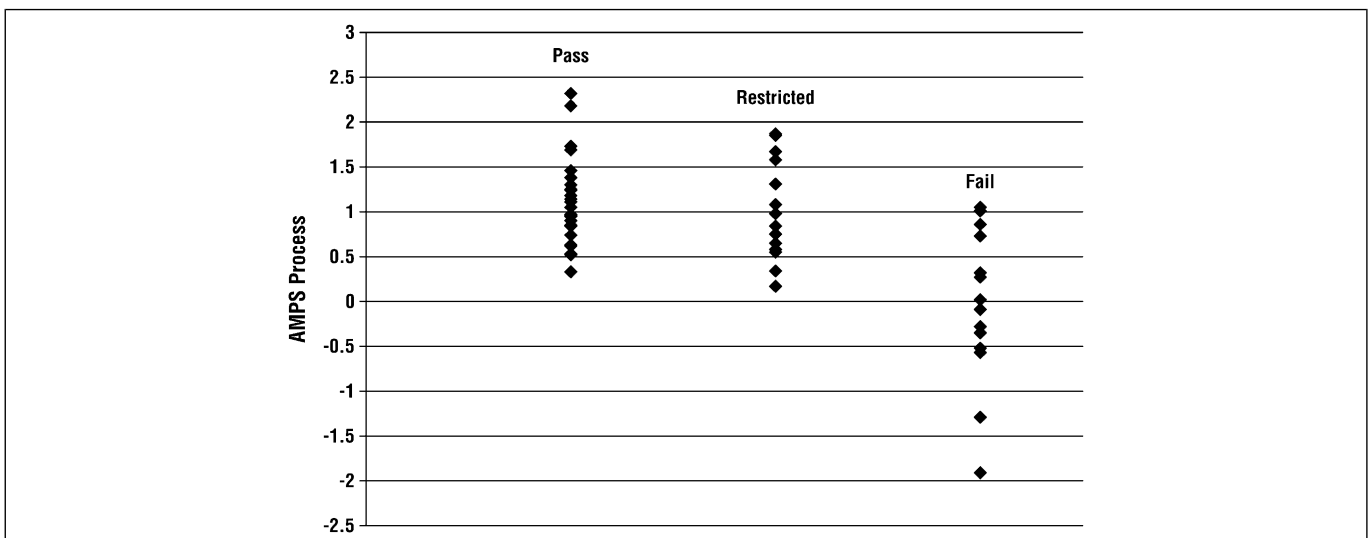


Figure 2. The relationship of the people who passed, failed, and were restricted based on the Assessment of Motor and Process Skills (AMPS) process scores. Each point represents 1 participant.

Occupational therapy practitioners are skilled in the ability to assess all areas of occupation and provide interventions to improve a client's functional performance. The *Occupational Therapy Practice Framework* was established to guide and define occupational therapy prac-

tice. Figure 3 illustrates an algorithm for determining occupational therapy services for community mobility—particularly, driving—that is based specifically on the *Framework*. The algorithm attempts to conceptualize how practitioners might address driving and community

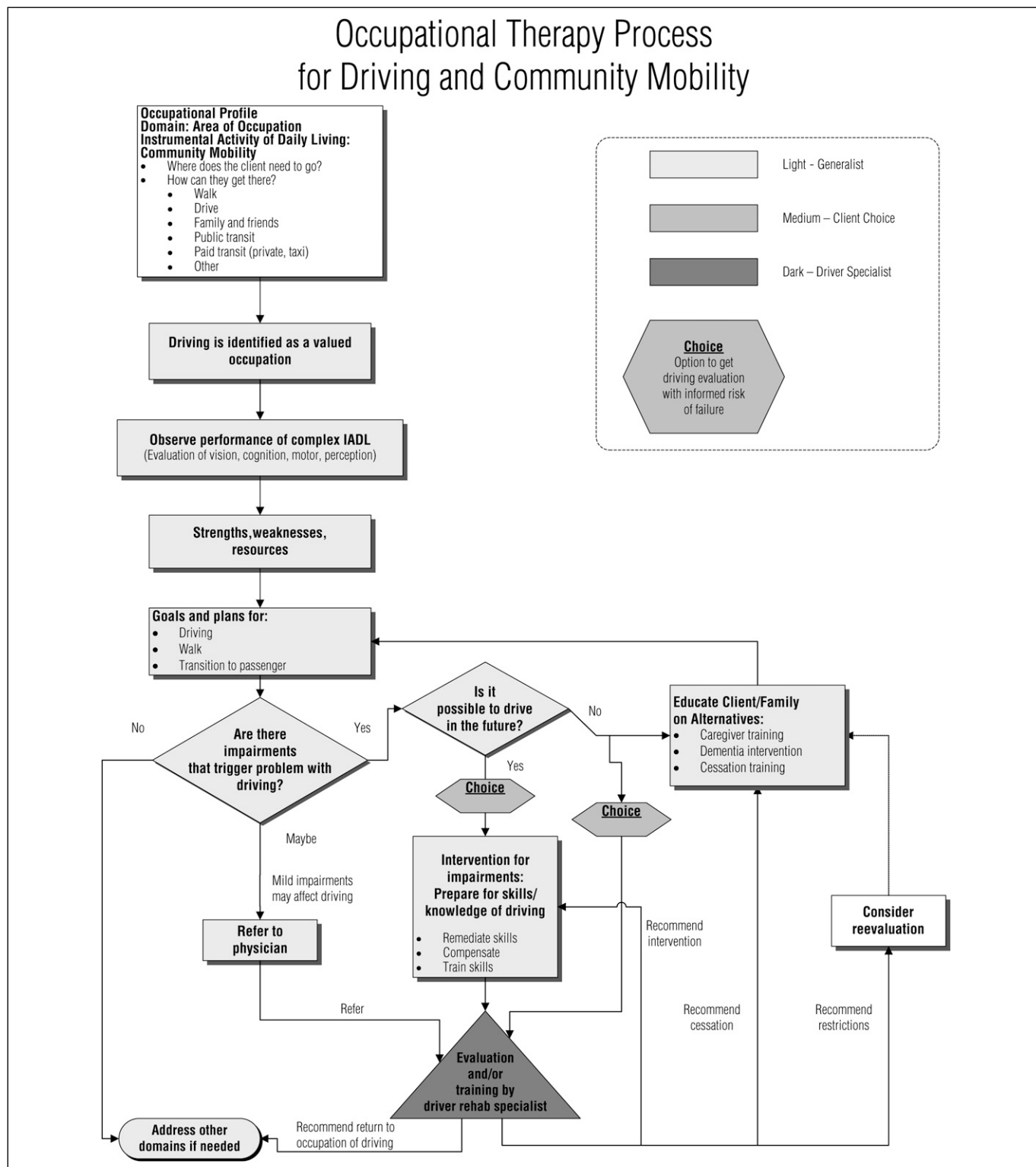


Figure 3. An algorithm for general practice occupational therapists when considering the complex instrumental activity of daily living of driving. It specifies the clinical reasoning process for determining occupational therapy services for community mobility and when to refer to a driving specialist.

mobility and illustrates a decision matrix that describes how various services and providers are involved when considering assessment, referral, and training.

Application for Clinical Reasoning: General Practice Occupational Therapy Practitioners

According to the *Framework*, occupational therapy practitioners working with adults consider all areas of occupation. Typically, mobility is considered a valued occupation that needs to be addressed. The practitioner needs to determine where the client needs and wants to go and the type of mobility desired. Fundamental to the occupational therapy evaluation is the observation of performance, including ADLs, IADLs, and other areas of occupation and incorporating specialized cognitive, sensory, visual, and perceptual assessments. The occupational therapist identifies areas of strength, weaknesses, and resources. To understand clients' goals related to participation and engagement, the therapist needs to know whether the client wants to drive. If the client wants to return to driving, the practitioner asks, "Does this person have any impairments that would trigger a problem with driving?" As indicated in the algorithm, the occupational therapy practitioner considers three possibilities: *no*, *yes*, or *maybe*.

With the first possibility, the answer to the question is no, and the practitioner would not address this particular area of occupation and would move on to other priorities. Not all impairments put driving into question; with older clients, however, asking about driving may be a good opportunity to provide education about safe driving and community mobility.

The second scenario is applicable to practice settings, which involve clients with acute changes or new diagnoses. The practitioner, in collaboration with the treatment team, would acknowledge that the client cannot drive at this time. The question becomes for how long and whether the recommendation for driving cessation, be it temporary or long term, can be justified on the basis of clinical evidence. This pilot study suggests that the general practitioner, in appropriate situations, can and should recommend not driving. An example would be a short-term recommendation after acute cerebrovascular accident. However, the recommendation not to drive for 3 months and then revisit the question with the physician does not complete the occupational therapy practitioner's responsibility. Occupational therapy is concerned with participation and engagement; if a client is not driving for any period, how will his or her needs be met? The general practitioner needs to identify alternatives and link the client with appropriate community mobility resources to ensure ac-

cess to health care and desired occupations. The recommendation should include time estimations for revisiting the question of driving. The plan should also identify the steps and resources to address the client's goals to resume driving and the options to assist with that decision.

The reality may be that the client's impairments are so significant that the team concurs that driving should cease for the long term. This possible decision may occur when a client is in advanced stages of a progressive condition such as dementia. In this situation, the occupational therapy intervention may focus on educating the client and family about the factors considered when coming to this decision. If the client or family members want to pursue specialist evaluation, they have the right to access that service at any time in the process (illustrated by the small box titled "choice" between the question and driving cessation in Figure 3). Accordingly, clients are better served by making sure they understand what that evaluation entails and the likelihood of not passing on the basis of clinical results and are thus well informed when choosing to try every option available. The generalist is concerned with the IADL of driving and community mobility. When driving is not an option, the therapy may turn to community mobility options either directly or by referral to a program that can provide the service. The generalist practitioner addressing community mobility would plan goals on the basis of other methods of transportation.

In the real world, some clients may insist that they possess the skills to drive and choose to immediately take a driving evaluation. In some cases, those clients may be best served by experiencing concrete failure. Therapy can then build on the problem list identified in the driving evaluation.

The third possibility the general practitioner considers occurs when the client has some mild impairment and the skills and services of the expert specialist in driving rehabilitation are required to make an individualized determination. The generalist practitioner would consult with the other team members to identify the impairments putting the driver at risk and make the referral to the specialist in driving rehabilitation at the optimal time.

A client who cannot drive today may be a candidate to resume or begin to drive in the future. In those cases, the general practitioner can work on skill building, implement strategies to remediate disabilities, or offer compensation and adaptations for physical motor issues. The practitioner may offer the message of "not yet" while working with the client on the skills and helping to determine the optimal time for referral to the DRS. Ideally, the client should be referred for driving evaluation when the subskills necessary to competently drive are optimized and chances for passing are at their highest.

Occupational therapists must appreciate that comprehensive driving evaluations, including the BTW assessment, are expensive both in money and in consequence. It is essential and of value to clients ready for this highest level of dynamic evaluation, but not all clients require the specialist evaluation. Using the analogy of cancer, not all cancer patients need to have magnetic resonance imaging because in some cases, an x-ray is sufficient to determine that the cancer has spread. The evaluation options and expenditures must match the symptoms and be defensible in their purpose. When the impairments fall into the questionable area, the client deserves the best and most highly regarded evaluation to demonstrate the ability to perform the task of driving in the most realistic context—that is, BTW assessment. DRSs' limited resources should be used and paid for by appropriate third-party payers in such situations.

Application for Clinical Reasoning: Specialists in Driving Rehabilitation

Referring to the lower section of the algorithm in Figure 3, consider the four basic outcomes from the DRS who, in addition to the clinical portion, observes the client in the BTW assessment. The first outcome is that no concerns are observed or the client may have mild impairments for which he or she can compensate. In other words, the impairments observed do not rise to a level significant enough to recommend restricted driving; this outcome is commonly referred to as “passing” the evaluation.

The second outcome is the recommendation of driving cessation. This outcome occurs when the risk is too great for the client to continue to drive. The client may be referred back to the occupational therapy general practitioner or other service provider for caregiver education or training to ensure safe transition to the passenger role with access to alternative modes of transportation.

A third outcome may indicate the potential for driving in the future. In such cases, the DRS could refer the client back to the occupational therapy generalist for strengthening identified subskills or proceed with specialized driving rehabilitation services for adaptation, vehicle modification, or driver training, depending on the needs and resources of the client.

A fourth typical outcome is passing with restrictions. In those cases, the client needs some sort of restricted license but can continue to drive for the time being. The option for a restricted license varies by state law. Ideally, client education would include planning for eventual transition to driving retirement. This outcome should include a plan for periodic reevaluation for clients with progressive diseases.

Implications for Occupational Therapy Practice

The components of this algorithm are not new to occupational therapy. We have developed this matrix to assist with the decision-making process using research evidence to better serve our clients with the occupation of community mobility. It is our wish to clarify and describe to health care providers, consumers, and their families where driving can fit within the complex health care system.

First, the health care team members need to make sure that transportation is addressed along with other high-risk IADLs, such as living alone or negotiating stairs to a second-story apartment, before the client is discharged. If occupational therapy truly addressed driving and community mobility as an IADL that consists of similar subskills and abilities, the client would be referred back to the generalist occupational therapist or other service provider for caregiver education or training in transitional skills as a passenger.

The reality is that all older adults should plan for retirement of driving in anticipation of driving cessation. Foley, Heimovitz, Guralnik, and Brock (2002) predicted that men will outlive their driving ability by 7 yr and women by 10 yr, so everyone should plan for driving retirement along with planning for retirement from work, changes in housing, and lifestyle.

At this time, however, this critical component of mobility transition is falling through the cracks. Occupational therapists concerned with driving and community mobility must become advocates and not just “take away the keys.” They must work with patients and their families to find ways to allow the person to continue his or her valued occupations and remain engaged in communities as participants. Driving is but one aspect. If practitioners do not recognize this advocacy component by modeling a more helpful response to clients, we may be feeding into the unfortunate belief that “life ends once one gives up the keys.” Our service is incomplete if we leave this important and valued occupation out of our intervention plans. All occupational therapists need to address driving and community mobility within their practice.

Second, as skilled evaluators in visual–perceptive, motor, and cognitive skills, there is much general occupational therapy practitioners can do to assist clients in the area of driving and community mobility. Occupational therapy practitioners must know their resources, including the scope of services offered to clients by DRSs. They must fully interpret and use the knowledge and evaluation results they have, referring to specialists appropriately following a decision pathway that is justifiable

in time and expense to the client and health care team. The results of this research suggest that the recommendation that each senior deemed at risk requires a comprehensive driving evaluation including a BTW component might, in fact, be flawed. Through evidence-based practice, informed therapists and programs should be encouraged to develop a network of services and a decision-making matrix acknowledging the varied needs of each client and his or her right to have access to the appropriate level of service at the optimal time.

Finally, almost all of the boxes displayed on the algorithm are potential intervention points that can be addressed by general practice occupational therapy practitioners working in hospital and community settings—therapists who address IADLs and whose services are reimbursed by third-party payers. The specialized service of the DRS is represented in a triangle. DRS services are often private pay, and programs describe high demand and satisfaction (of clients and families) when the appropriate clients avail themselves of this specialized service. The smaller box indicates a situation in which the client might choose to pay privately for the driving evaluation on the basis of his or her desire rather than need or referral to the service.

Occupational therapy professionals in the generalist setting must do their part in identifying clients most at risk and offer intervention within their scope of practice and training. Decisions for referral and demand for specialized service should grow as we clearly identify those clients requiring the comprehensive driving evaluation, training, equipment and vehicle modification interventions critical to ensuring access to this highly valued IADL for all clients with the goal of driving. Driving rehabilitation programs are limited in number and geographic distribution. They can be expected to grow only if the demand increases and the referrals are appropriate.

Limitations

The research supporting this algorithm has several limitations. First, the number of participants was relatively small. In addition, the participants were from two separate centers with four DRSs and four calibrated AMPS raters. However, no significant differences between the centers were found in the AMPS ratings. The raters were skilled in the assessment, and the AMPS has strong interrater reliability (Bernspång, 1999; Fisher, 2003). Another issue is the fidelity of the BTW assessment route. The decision to pass, fail, or recommend restrictions is based on the therapists' clinical judgment, a typical approach for most driving evaluations. Unfortunately, BTW assessments

cannot be completely standardized because of the nature of a community drive. However, both centers' routes incorporated turns and progression of increased cognitive demand, again typical for BTW assessments.

Conclusion

With increasing longevity and the desire of older adults to remain living independently in their homes, the need to depend on personal motor vehicles for community mobility will continue. With increased age comes increased risk of medical conditions that will affect driving. In a recent study in Missouri, almost half of the reported drivers had an indication of dementia or cognitive impairment in their record (Meuser et al., 2008). Impairments need to be correlated with driving risk as well as inform and support the transportation needs of clients. The acute need for specialists in driving rehabilitation may become more severe. Unless the occupational therapy profession addresses this specific domain of practice, the demand for driving screenings and assessments will be met by other professionals. This study suggests that experienced general practice occupational therapy practitioners should be able to make appropriate recommendations about the IADL of driving and community mobility in response to skilled observation of complex IADLs. Our study used a sensitive and standardized assessment, the AMPS. We argue, however, that the observed performance, not the specific assessment tool, is the critical factor.

Occupational therapy practitioners are trained in the knowledge and skills of observing and determining levels of functional performance. Sending clients to the DRS at the right time and when they are optimally prepared to pass saves not only money but also time and emotional consequences. DRS programs need to be used in an effective and efficient manner with an appropriate referral system. Occupational therapy practitioners can use the algorithm presented to determine the appropriate time, interventions, and strategies to meet senior clients' driving needs in a way that is fruitful and positive for the health care system, our communities, and the clients themselves. ▲

References

- ADED. (2008). *CDRS directory search*. Retrieved August 4, 2010, from www.driver-ed.org/custom/directory-cdrs/?pageid=467&showTitle=1
- Adler, G., & Kuskowski, M. (2003). Driving cessation in older men with dementia. *Alzheimer Disease and Associated Disorders*, *17*, 68–71. doi:10.1097/00002093-200304000-00003
- American Automobile Association. (2005). *Roadwise review*. Heathrow, FL: AAA Public Affairs.

- American Occupational Therapy Association. (2007, September). *AOTA driving experts meeting: Summary document*. Bethesda, MD: Author.
- American Occupational Therapy Association. (2008a). *Finding a driving specialist*. Retrieved August 4, 2010, from www1.aota.org/driver_search/index.aspx
- American Occupational Therapy Association. (2008b). Occupational therapy practice framework: Domain and process (2nd ed.). *American Journal of Occupational Therapy*, *62*, 625–683.
- Bernspång, B. (1999). Rater calibration stability for the Assessment of Motor and Process Skills. *Scandinavian Journal of Occupational Therapy*, *6*, 101–109. doi:10.1080/110381299443681
- Bernspång, B., & Fisher, A. G. (1995). Differences between persons with right or left cerebral vascular accident on the Assessment of Motor and Process Skills. *Archives of Physical Medicine and Rehabilitation*, *76*, 1144–1151. doi:10.1016/S0003-9993(95)80124-3
- Carr, D. B. (2010). *Physicians guide to assessing and counseling older drivers* (2nd ed.). Chicago: American Medical Association. Retrieved August 11, 2010, from www.ama-assn.org/ama/pub/physician-resources/public-health/promoting-healthy-lifestyles/geriatric-health/older-driver-safety/assessing-counseling-older-drivers.shtml
- Centers for Medicare and Medicaid Services. (2008). Covered medical and other health services. In *Medicare benefit policy manual* (CMS Pub. No. 100–02, Chapter 15). Retrieved March 28, 2008, from www.cms.hhs.gov/manuals/Downloads/bp102c15.pdf
- Classen, S. (2008, April). *Population-based health promotion perspective for older driver safety: Conceptual framework to intervention plan*. Paper presented at the 88th AOTA Annual Conference & Expo, Long Beach, CA.
- Cooke, K. Z., Fisher, A. G., Mayberry, W., & Oakley, F. (2000). Differences in activities of daily living process skills of persons with and without Alzheimer's disease. *OTJR: Occupation, Participation and Health*, *20*, 87–105.
- Dellinger, A. M., Sehgal, M., Sleet, D. A., & Barrett-Connor, E. (2001). Driving cessation: What older former drivers tell us. *Journal of the American Geriatrics Society*, *49*, 431–435. doi:10.1046/j.1532-5415.2001.49087.x
- Dickerson, A. E. (2009). *Driver rehabilitation specialists' use of assessment: A survey*. Unpublished raw data.
- Dickerson, A. E., & Fisher, A. G. (1993). Age differences in functional performance. *American Journal of Occupational Therapy*, *47*, 686–692.
- Dickerson, A. E., & Fisher, A. G. (1995). A culture-relevant performance assessment of the Hispanic elderly. *OTJR: Occupation, Participation and Health*, *15*, 50–68.
- Dickerson, A. E., & Fisher, A. G. (1997). Effects of familiarity of task and choice on the functional performance of younger and older adults. *Psychology and Aging*, *12*, 247–254. doi:10.1037/0882-7974.12.2.247
- Dickerson, A. E., Molnar, L. J., Eby, D. W., Adler, G., Bédard M., Berg-Weger, M., et al. (2007). Transportation and aging: A research agenda for advancing safe mobility. *Gerontologist*, *47*, 578–590.
- Dobbs, B., Carr, D. B., & Morris, J. C. (2002). Management and assessment of the demented driver. *Neurologist*, *8*, 61–70. doi:10.1097/00127893-200203000-00001
- Doble, S. E., Fisk, J. D., Fisher, A. G., Ritvo, P. G., & Murray, T. J. (1994). Functional competence of community-dwelling persons with multiple sclerosis using the assessment of motor and process skills. *Archives of Physical Medicine and Rehabilitation*, *75*, 843–851. doi:10.1016/0003-9993(94)90107-4
- Duran, L. J., & Fisher, A. G. (1996). Male and female performance on the Assessment of Motor and Process Skills. *Archives of Physical Medicine and Rehabilitation*, *77*, 1019–1024. doi:10.1016/S0003-9993(96)90062-3
- Eby, D. W., Molnar, L. J., Shope, J. T., Vivoda, J. M., & Fordyce, T. A. (2003). Improving older driver knowledge and self-awareness through self-assessment: The Driving Decisions Workbook. *Journal of Safety Research*, *34*, 371–381. doi:10.1016/j.jsr.2003.09.006
- Fisher, A. G. (2003). *Assessment of Motor and Process Skills: Vols. I and II* (5th ed.). Fort Collins, CO: Three Star Press.
- Foley, D. J., Heimovitz, H. K., Guralnik, J. M., & Brock, D. B. (2002). Driving life expectancy of persons aged 70 years and older in the United States. *American Journal of Public Health*, *92*, 1284–1289. doi:10.2105/AJPH.92.8.1284
- Fonda, S. J., Wallace, R. B., & Herzog, A. R. (2001). Changes in driving patterns and worsening depressive symptoms among older adults. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *56B*, 343–351.
- Fox, G. K., Bowden, S. C., Bashford, G. M., & Smith, D. S. (1997). Alzheimer's disease and driving: Prediction and assessment of driving performance. *Journal of the American Geriatrics Society*, *45*, 949–953.
- Goto, S., Fisher, A. G., & Mayberry, W. L. (1996). AMPS applied cross-culturally to the Japanese. *American Journal of Occupational Therapy*, *50*, 798–806.
- Hartman, M. L., Fisher, A. G., & Duran, L. (1999). Assessment of functional ability of people with Alzheimer's disease. *Scandinavian Journal of Occupational Therapy*, *6*, 111–118.
- Hunt, L. A., Brown, A., & Gilman, I. P. (2010). Drivers with dementia and outcomes of becoming lost while driving. *American Journal of Occupational Therapy*, *64*, 225–232.
- Insurance Institute for Highway Safety. (2008). Older drivers' fatal crashes trend down. *Status Report*, *43*(11), 4–5. Retrieved from www.iihs.org/externaldata/srdata/docs/sr4311.pdf
- Kottorp, A., Bernspång, B., & Fisher, A. G. (2003). Validity of a performance assessment of activities of daily living for people with developmental disabilities. *Journal of Intellectual Disability Research*, *47*, 597–605. doi:10.1046/j.1365-2788.2003.00475.x
- Langford, J., Braitman, K., Charlton, J., Eberhard, J., O'Neill, D., Staplin, L., et al. (2008). TRB Workshop 2007: Licensing authorities' options for managing older driver safety—Practical advice from the researchers. *Traffic Injury Prevention*, *9*, 278–281. doi:10.1080/15389580801895210

- Marottoli, R. A., Mendes de Leon, C. F., Glass, T. A., Williams, C. S., Cooney, L. M., Jr., Berkman, L. F., et al. (1997). Driving cessation and increased depressive symptoms: Prospective evidence from the New Haven EPESE. Established Populations for Epidemiologic Studies of the Elderly. *Journal of the American Geriatrics Society*, *45*, 202–206.
- Meuser, T. M., Carr, D. B., Ulfarsson, G. F., Berg-Weger, M., Niewoener, P., Kim, J. K., et al. (2008). *Medical fitness to drive and a voluntary state reporting law*. Washington, DC: AAA Foundation.
- National Highway Traffic Safety Administration. (2007). *Traffic safety facts 2007: Older population*. Retrieved August 4, 2010, from www.dmv.ne.gov/highwaysafety/pdf/TSFOlderPopulation2007.pdf
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research* (3rd ed.). Fort Worth TX: Harcourt Brace College.
- Plassman, B. L., Langa, K. M., Fisher, G. G., Heeringa, S. G., Weir, D. R., Ofstedal, M. B., et al. (2007). Prevalence of dementia in the United States: The aging, demographics, and memory study. *Neuroepidemiology*, *29*, 125–132. doi:10.1159/000109998
- Ragland, D. R., Satariano, W. A., & MacLeod, K. E. (2005). Driving cessation and depressive symptoms. *Journals of Gerontology, Series A: Medical Sciences*, *60A*, 399–403.
- Rowe, M. A., Feinglass, N. G., & Wiss, M. E. (2004). Persons with dementia who become lost in the community: A case study, current research, and recommendations. *Mayo Clinic Proceedings*, *79*, 1417–1422. doi:10.4065/79.11.1417
- Silverstein, N. M., Flaherty, G., & Tobin, T. S. (2002). *Dementia and wandering behavior: Concern for the lost elder*. New York: Springer.
- Transportation Research Board. (2009, January 19). *Driver Medical Review Joint Subcommittee of ANB30 Operation Education and Regulation Committee and ANB60 Safe Mobility of Older Persons Committee*. Washington, DC: TRB Annual Meeting.
- Wheatley, C. J., & Di Stefano, M. (2008). Individualized assessment of driving fitness for older individuals with health, disability, and age-related concerns. *Traffic Injury Prevention*, *9*, 320–327. doi:10.1080/15389580801895269
- Wright, B. D., & Masters, G. N. (1982). *Rating scale analysis*. Chicago: MESA Press.