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An Occupational Therapy Guide to Assessment of Executive Function of Rural Agriculture Workers

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An Occupational Therapy Guide to Assessment of Executive Function of Rural Agriculture Workers

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This Scholarly Project Paper, submitted by and in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done is hereby approved.

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ABSTRACT

Purpose: Develop a guide for occupational therapists working with rural agricultural-based individuals' experiencing cognitive deficits. Methodology: A comprehensive literature review was completed with major topics including the definition of executive functioning, common duties of ranch/farm workers, relationship between executive functioning and work, rural agriculture culture. The goal of the literature review was to gain an understanding of the influence of executive functioning skills on engagement within occupational duties and tasks of rural agriculture workers. Results: An occupational therapy guide was developed to provide a list of common tasks/duties of ranchers/framers and the associated executive functioning skills as well as client factors. The guide intends to assist therapists in assessing executive functioning deficits in common duties/tasks of the rural agriculture worker in order to provide a more occupation-based evaluation. Conclusions: The occupational therapist's assessment and intervention of executive functioning skills for ranch and/or farm workers should be directed by The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers to foster client-centered practice which meets the occupational performance needs of the individual.

CHAPTER I

INTRODUCTION

Most recent statistics indicate that in 2002, there were 730 deaths and 150,000 disabling injuries on U.S. farms as a result of the dangers associated with working with machinery and motor vehicles (National Safety Council, 2002). Accidental death rates of those working in agriculture were 29 per 100,000 thousand in 2010 (National Safety Council, 2010). The agriculture population is involved in an occupation that is consistently ranked one of the most dangerous occupations in the United States (Miller, 2012). According to Dickie (2003), work is defined as an activity that supports the survival of oneself and one's family and it is a central condition of human life. The rural agriculture population is unique in regards to the cultural factors associated with this population including the lack of distinction between work and lifestyle (Young & Murphy, 1998, p.179).

The targeted population for this scholarly project is the working rural agriculture population. The student authors both have personal experience with the rural agriculture population and have observed an occupational therapist (OT) working with an individual with a rural agriculture background who had sustained a traumatic brain injury. Based on observation of therapy, experiences with rural agricultural workers and a preliminary review of the professional literature, a need was identified for increased understanding of the farm or ranch worker experiencing executive functioning deficits on work performance.

The product of the scholarly project is a guide to facilitate the treatment process for occupational therapists working with the rural agriculture population experiencing difficulties related to executive function. The proposed intervention is the implementation of The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers. The guide includes a listing of duties in which farmers and ranchers commonly engage, created by Occupational Information Network (O*NET). The Guide identifies which executive functioning skills (Matheson, Dodson & Wolf, 2011) are associated with each duty, as well as client factors from the American Occupational Therapy Practice Framework: Domain and Practice (2008). A listing of executive functioning assessments utilized within the occupational therapy profession is provided to give the therapist a resource of assessments currently used within occupational therapy practice.

The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers is based on the Person Environment Occupation (PEO) Model (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). The PEO model focuses on the interaction between the person, environment and the occupation. The PEO model is well-suited for use across an individual's lifespan and across a wide range of cultures. The use of the model exemplifies the importance of the occupational therapist addressing the agricultural worker's context and occupational demands.

For the purposes of this scholarly project, the following terms will be defined as presented here.

- Rural Agriculture: the practice of engaging in and supporting economic profitability, quality and well-being of the environment as well as efficient use of

natural resources (US Department of Agriculture, 2012); includes unique characteristics of many rural agricultural communities include isolation, low population density, and lack of transportation services (Schweitzer, Deboy, Jones & Field, 2011).

- Executive function is defined as the skills that control emotional responses and provide coordination and integration of the basic cognitive processes (Matheson, Dodson, and Wolf, 2011 p. 1)

Few studies have focused on the needs of the executive functioning needs of then rural agricultural population. There is limited understanding of the farm or ranch worker experiencing executive functioning deficits on work performance. The culture and the close association between work and lifestyle within the target population stress the importance for the therapy process to be as client-centered as possible and return clients to their occupations as soon as possible. The work demands and duties common to the rural agriculture worker require the use of executive functioning skills and therefore there is a need to assess these skills in order to determine the client's ability to return safely and productively to engagement in work and personal lifestyle.

CHAPTER II

LITERATURE REVIEW

Introduction to Executive Functioning

Higher order thinking capabilities allow individuals to engage successfully in the environment (Braveman & Page, 2012). The term executive functioning covers a broad range of mental control skills and these specific skills differ amongst healthcare researchers and practitioners. These capabilities are also known as executive functioning, and although terms may differ within the executive functioning definition, the skills needed for completion of occupation-based tasks are similar (Cooper-Kahn & Dietzel, 2008). Matheson, Dodson, and Wolf (2011) explain that "executive functions control emotional responses and provide coordination and integration of the basic cognitive processes" (p. 1). Executive functioning refers to skills required during higher order cognitive processing. The skills include initiation, planning, self-regulation, and goal directed behavior (Lezak, Howieson & Loring, 2004). Executive functions are a set of processes that all have to do with managing oneself and one's resources in order to achieve a goal (Occupational Information Network, 2010). Executive functioning is an umbrella term for the neurologically-based skills involving mental control and self-regulation (Cooper-Kahn & Dietzel, 2008). The executive functioning skills needed for the task at hand differ according to the demands of the activity. The National Center for Learning Disabilities (2012) emphasize that executive function is a set of mental

processes that helps connect past experience with present action. The connection between past experience and present actions may include activities such as planning, organizing, strategizing, paying attention to and remembering details, and managing time and space (The National Center for Learning Disabilities, 2012).

Deficits in executive functioning can be the result of a traumatic event or from the onset of a disease. Deficits in executive functioning may have an early onset and be lifelong such as a learning disability (National Center for Learning Disabilities, 2012) or executive functioning impairments may be due to an acute event such as a traumatic brain injury (Matheson, Dodson & Wolf, 2011). Deficits in executive function may also be seen in individuals with attention deficit disorder, Tourettes, or autism (Ozonoff & Jensen, 1999). If experiencing disruptions in executive functioning, everyday routine tasks and everyday occupations may become more difficult (Bechara, Damasio, & Damasio, 2000).

Relationship of Executive Functioning to Work

The skills associated with executive functioning affect all aspects of life including work. "Comprised higher-level cognitive processing [executive functioning] ability can have devastating effects on ability to function in complex, real-world environments like those encountered in the work world" (Braveman & Page, 2012, p.295). Braveman and Page (2012) define work as a "means of providing a financial or other source of reward to support our daily existence and helps us to meet our need for food and shelter" (p. 3). Dickie (2003) further defines work as activity that supports the survival of oneself and one's family and it is a central condition of human life. Not only does work provide for individuals economically, but it also has emotional, psychological and social impacts.

The identity of a person is in some way tied to whether or not the person or society values the work (Braveman & Page, 2012).

The American Occupational Therapy Practice Framework identifies "job performance as work skills and patterns; time management, relationships with co-workers, manager, and customers; creation, production, and distribution of products and services; initiation, sustainment, and completion of work; and compliance with work norms and procedures" (American Occupational Therapy Association, 2008, p. 632). Job performance is influenced by an individual's executive functioning skills including decision-making, abstract thinking, planning, mental flexibility and appropriate behavior (World Health Organization, 2001). The vocational choices that an individual chooses, provides a sense of who they are and how they identify themselves (Christiansen & Townsend, 2010).

The U.S. Secretary of Labor appointed the Secretary's Commission on Achieving Necessary Skills (SCANS) to identify the skills persons need to succeed in the world of work. SCANS recognized three foundational skills needed for solid job performance. These foundational skills include basic skills, thinking skills, and personal qualities (U.S. Department of Labor, 1991). The basic skills consist of reading, writing, listening, speaking, and mathematic skills; thinking skills were identified as the ability to learn, reason, think creatively, make decisions, and problem solve; the foundational skill includes personal qualities and is recognized as individual responsibility, integrity, confidence, and the ability to manage one's self (U.S. Department of Labor, 1991). The ability for an individual to complete the thinking skills identified by the U.S. Department

of Labor, require the executive functioning skills of initiation, planning, self-regulation, and goal directed behavior as identified by Lezak et al. (2004).

Introduction to Agriculture

The United States Department of Agriculture defines agriculture as the practice of engaging in and supporting economic profitability, quality and well-being of the environment as well as efficient use of natural resources (2012). Operations include planting, growing and harvesting crops as well as the management and care of livestock (United States Department of Agriculture, 2010). Agricultural products are sold and utilized daily in a variety of contexts and for multiple reasons. The agriculture industry is large enough that it accounts for approximately 42 percent of the world's laborers and the future of agriculture is expected to continue as a valued business (University of Michigan, 2012).

Rural Agricultural Culture

Rural agriculture has cultural implications that not only affect the method and process of working in agriculture but also impacts the lifestyle and how the population identifies itself. "Farmers have a strong affiliation with the land. Their job is more than their work, it is their life" (Young & Murphy, 1998, p.179). There is usually a lack of separation between work and home lifestyle. The importance of farms and ranches being passed down from one generation to the next is emphasized in Rosmann (2008) where he/she states "Losing the family farm is the ultimate loss—bringing shame to the generation that has let down their forebears and dashing their successors' dreams" (p. 1). According to the 2007 Census of Agriculture, 86.5% of farms are family owned, indicating the cultural practice of transferring the property from generation to generation.

As stated by C. Nelson, a South Dakota rancher/farmer, “it is ideal for the ranch or farm to be kept within the family and taken over by children or grandchildren because there is a drive to continue what your parents and grandparents have worked so hard for” (personal communication, September 20, 2012). This expectation often results in generations of this population being specifically skilled in occupations directed toward agriculture and not toward other professions (Young & Murphy, 1998). The close-knit makeup of the rural agriculture population depends heavily on the involvement of family members and their role within the agriculture environment. B. Herman, a local Wyoming rancher, acknowledged that rancher workers are hesitant in allowing others to manage their ranch or farm due to the fine details, as well as the specific routines and patterns of the ranch work that are consistent to their particular ranch (personal communication, September 15, 2012).

Values and Beliefs

The unwritten rules of the rural agriculture population vary among communities, and may differ vastly from urban contexts. Work hours are dependent upon growing seasons as well as climate variations (Smallfield & Anderson, 2008). The rural agriculture rancher/farmer is not paid hourly, therefore the long days put in may not always be monetarily valuable. A conservative lifestyle is typical of the rancher/farmer due to the unreliability of predicted income. The level of unpredictability may include factors such as the weather and market fluctuations (Smallfield & Anderson, 2008). It is common for payment of good to be received once or twice a year therefore encouraging conservation and careful consider of needs and purchases. “Producers are often the business manager, mechanic, laborer, and office assistant all at one time. They often live

and work in the same location; this makes it difficult for them to separate work from family and leisure life" (Smallfield & Anderson, 2008).

The unique characteristics of many rural agricultural communities include isolation, low population density, and lack of transportation services (Schweitzer, Deboy, Jones & Field, 2011). Hartley (2004) reports that access to healthcare is hindered by geographical barriers because of the remote location of rural farm and ranch production sites. Agriculture workers may not always seek the healthcare services they require due to both external and internal components. The external component may consist of the environmental or social pressure to deal with the issue themselves rather than pursuing outside help. Friesen, Krassikouva-Enns, Ringaert and Isfeld (2010) determined that "farm families' needed assistance with navigating the health care system, including mental health services, access to information on financial and insurance services, suitable and affordable adaptive technology and modified equipment as well as access to caregiver support" (p173). The tendency of the rural agriculture population is to be self-reliant and avoid seeking behavioral healthcare, even when seeking it may be beneficial (Roy, 2001). Internally, they may struggle with the feelings of failure by not being able to manage the situation themselves. If the individual does seek out services, paying for healthcare is complicated by the fact that the majority of ranchers and farmers are self-insured (Lottero, Pryor, Rukavina, Prottas, & Knudson, 2007). The amount of time that it takes to reach these services, as well as the cost and stigma of pursuing healthcare, contribute to the demands and limitations of the rural agriculture population (Martinez-Brawley, & Blundall, 1991). Schweitzer et al. (2011) emphasized that rural residents

with disabilities are at significant risk for mental/behavioral health issues complicated by the lack of mental/behavioral health services and resources.

Duties of Ranch/Farm Work

There are physical and mental demands for the agricultural population specific to rural agricultural culture. The O*NET acronym stands for "Occupational Information Network." It is a database that replaces the Dictionary of Occupational Titles (DOT) as the nation's primary source of occupational information (O*NET, 2010). The duties and tasks of farmers, ranchers, and other agricultural managers as recognized by O*Net (2010) are presented in Table 1.

Table 1:

Duties/Tasks of farmers/ranchers

1) Determine types or quantities of crops or livestock to be raised, according to factors such as market conditions, federal programs or incentives, or soil conditions.
2) Direct crop production operations, such as planning, tilling, planting, fertilizing, cultivating, spraying, or harvesting.
3) Direct the breeding or raising of stock, such as cattle, poultry, or honeybees, using recognized breeding practices to ensure stock improvement.
4) Evaluate marketing or sales alternatives for farm or ranch products.
5) Hire, train, or supervise workers engaged in planting, cultivating, irrigating, harvesting, or marketing crops, or in raising livestock.
6) Inspect farm or ranch structures, such as buildings, fences, or roads, ordering repair or maintenance activities, as needed.
7) Maintain financial, operational, production, or employment records for farms or ranches.
8) Monitor activities such as irrigation, chemical application, harvesting, milking, breeding, or grading to ensure adherence to safety regulations or standards.
9) Monitor pasture or grazing land use to ensure that livestock are properly fed or that conservation methods, such as rotational grazing, are used.
10) Negotiate with buyers for the sale, storage, or shipment of crops or livestock.
11) Obtain financing necessary for purchases of machinery, land, supplies, or livestock.
12) Operate or oversee the operations of dairy farms that produce bulk milk.
13) Operate or oversee the operations of poultry or swine farms producing meat, eggs, or breeding stock.
14) Plan crop activities based on factors such as crop maturity or weather conditions.
15) Prepare budgets or financial reports for farm or ranch operations.
16) Select or purchase machinery, equipment, livestock, or supplies, such as seed, feed, fertilizer, or chemicals.
17) Supervise the construction of farm or ranch structures, such as buildings, fences, drainage systems, wells, or roads.
18) Analyze market conditions to determine acreage allocations.
19) Analyze soil to determine types or quantities of fertilizer required for maximum crop production.
20) Buy or sell futures contracts or price farm products in advance of future sales to minimize risk or maximize profits.
21) Demonstrate or explain working techniques, practices, or safety regulations to farm or ranch workers.

22) Direct livestock or crop waste recycling operations.
23) Inspect farm or ranch equipment to ensure proper functioning.
24) Inspect orchards or fields to determine crop maturity or condition or to detect disease or insect infestation.
25) Monitor and adjust irrigation systems to distribute water according to crop needs and to avoid wasting water.
26) Plan and direct development or production of hardier or higher-yield hybrid plant varieties.
27) Replace chemical insecticides with environmentally friendly practices, such as adding pest-repelling plants to fields.

O*NET. (2010). *Onetonline*. Retrieved from http://www.onetonline.org/link/summary

Impact of Executive Functioning on Agriculture Work

Specific executive functioning skills that are necessary for work within the agriculture population as identified by O*NET (2010) include active listening, critical thinking, monitoring, coordination, operation and control, selective attention, deductive and inductive reasoning, oral expression, equipment selection, mathematical reasoning, and judgment and decision making. To understand a person, it is important to look at which executive skills are problematic for them and to what degree (Cooper-Kahn & Dietzel, 2008). In addition, interacting with coworkers and consumers, family members, and employees is a necessity in most work settings and requires executive functioning skills (Matheson, Dodson, & Wolf, 2011). The executive functioning skills can be distinguished between emotional/behavioral self-control and metacognitive coordination as presented by Matheson, Dodson and Wolf (2011) in Table 2 and Table 3. In Table 3 Matheson, Dodson and Wolf (2011) identify the executive functions that facilitate the ability to quickly and accurately coordinate basic cognitive components such as short-term and procedural memory with auditory, visual, tactile, and spatial sensory inputs while maintaining both task and situational awareness is crucial to occupational performance.

Table 2:

Executive Functions: Emotional and Behavioral Self-Control

Skill	Definition
Impulse Inhibition	The ability to inhibit, resist, or not act on an impulse, and the ability to stop or modify interpersonal behavior at the appropriate time.
Cognitive Flexibility	The ability to transition from one situation or aspect of a task to another.
Emotional Control	The ability to modulate emotional responses to be appropriate for the circumstances.
Self-Awareness	The ability to perceive and keep track of one' behavior and how this behavior affects other people.

Matheson,L., Dodson, M., & Wolf, T. (2011, March). Executive dysfunction and work: Tying it all together. *Work & Industry Special Interest Section Quarterly, 25*(1), 1-4. Bethesda, MD: American Occupational Therapy Association.

Table 3:

Executive Functions: Metacognitive Coordination

Initiation	The ability to begin a task or activity and independently generate ideas, responses, or problem-solving strategies
Working Memory	The ability to actively hold information in one's mind and carry out multistep activities, implement a sequence of actions, or follow complex instructions.
Plan and Maintain Organization	The ability to manage current and future task demands and anticipate the steps necessary to carry out a task.
Task Monitor	The ability to maintain organization of procedures and keep track of problem-solving success or failure and learn from mistakes.
Organization of Materials	The ability to maintain adequate resources in an orderly work environment, including collecting and organizing

	the tools, equipment, and materials necessary to perform a task.

Matheson,L., Dodson, M., & Wolf, T. (2011, March). Executive dysfunction and work: Tying it all together. *Work & Industry Special Interest Section Quarterly, 25*(1), 1-4. Bethesda, MD: American Occupational Therapy Association.

Injuries and Agriculture

Every day, approximately 243 agricultural workers suffer a loss of work time due to injuries that are occurred during work (Farm Progress, 2009). The injuries that cause the most disruption in work time include: amputations, spinal cord injuries, fractures, and crushes (Friesen et al., 2010). Significant psychological hazards are associated with agriculture, including high levels of stress, depression, and increased rates of suicide (Friesen et al., 2010). Farmers attribute injuries to personal factors such as fatigue, urgency, carelessness, and inattention (Beseler & Stallones, 2011).

The demands of agriculture and the lifestyle of its workers can make for a rewarding career but also one which is dangerous and stressful. In 2002, there were 730 deaths and 150,000 disabling injuries occurred on U.S. farms, as a result of the dangers associated with working with machinery and motor vehicles (National Safety Council, 2002). With accidental death rates of those working in agriculture at 29 per 100,000 thousand (National Safety Council, 2010), workers engaged in production agriculture are involved in a dangerous occupation, as farming is consistently ranked one of the most dangerous occupations in the United States (Miller, 2012). Personal factors such as fatigue, urgency, carelessness, and inattention have the potential to contribute to injury in the agricultural workplace and may be signs of a breakdown in executive functioning that could be prevented (Beseler & Stallones, 2011). Homaifar, Bahraini, Silverman, and Brenner (2012) encourage health professionals to evaluate the executive functioning

skills impulsivity, insight, as well as the thinking process. These skills are essential for individuals returning to work in agriculture production as independently as possible. If health professions fail to recognize a patient's cognitive impairments this can lead to dangerous working conditions for the patient on a farm/ranch, creating danger for others working around them.

Impact of Injury

Friesen, Krassikouva-Enns, Ringaert and Isfeld (2012) indicated that farmers are hesitant to leave their valued occupation, even after serious injury. To ask farmers to give up their job is to ask them to move from their home, and to possibly give up their own identify, as well as their fathers' and fore-fathers' identify (Young & Murphy, 1998). Decreased outside education limits the ability of injured or disabled farmers and ranchers to pursue career options other than returning to their previous lifestyle in agriculture production (Young, Strasser & Murphy, 2004). What is unfathomable for many of those employed in this setting, is the thought of having to leave their current vocation to pursue other careers. There is some discrepancy within literature on the return to work rates of agriculture workers. Young, Strasser and Murphy (2004) indicated that those working on farms or ranches have a higher return to work rate than professions outside the realm of agricultural work. According to Blanford, Grob, Redding and Rolle (2002), agriculture workers took longer to return to work, if they returned at all. Blanford et al. (2002) hypothesized that this may be due to the severity of the injuries or the lack of opportunities in the agriculture industry. Despite this discrepancy of return to work rate, the dedication and commitment to rural agriculture as a vocation influences the desire to return to work and lifestyle (Young, Strasser & Murphy, 2004).

Executive functioning

As holistic health care providers, client centered practice should be carried over into all aspects of an individual's intervention, including the assessment portion (Law, Baum, & Dunn, 2005). Assessments occupational therapy practice utilize a variety of techniques to evaluate the skills of an individual including formal and informal observation of functional activities, questionnaires, interviews, and standardized measures that evaluate level of performance based on norms (Hemphill-Pearson, 2008). In addition, caregiver questionnaires can also be used to gain greater insight into the individual's functioning (Rocke, Hays, Edwards & Berg, 2008).

Baum, Conner, Morrison, Hahn Dromerick and Edwards (2008) report the Executive Functioning Performance Test (EFPT) to be a reliable and valid measuring of executive functioning abilities in individuals with mild to moderate stroke. Both Baum et al. (2008) and Rocke, et al. (2008) recognized the following performance measures that have been utilized as assessments of executive functioning: the Kitchen Task Assessment (KTA) (Baum & Edwards, 1993) and the Assessment of Motor and Processing Skills (Fisher, 2003). Baum et al. (2008) also identified of the Allen's Cognitive Levels Test Battery (Allen, Earhart, & Blue, 1992) as a measure of performance of instrumental tasks.

Assessment of executive functioning was also important when assessing the needs of children. Hahn-Markowitz, Manor & Maeir, (2011) utilized the Tower of London-Drexel University (Culbertson & Zillmer, 2005), an executive functioning assessment looking at impairments in planning in children with attention deficit disorder. Rocke et al.

(2008) developed and studied the validity of the Children's Kitchen Task Assessment (CKTA), a modified version of the KTA. The results of the study found that the CKTA presented as a valid assessment when evaluating children's executive functioning (Rocke et al., 2008).

Korner-Bitensky, Barrett-Bernstein, Bibas and Poulin (2011) reported the Mini Mental State Exam (MMSE) (Folstein, Folstein & McHugh, 1975) as utilized most frequently by occupational therapists in order to assess executive functioning of individuals post-stroke. The next two most frequently used assessments included the Cognitive Competency Test (CCT) (Tupper & Cicerone, 1990), followed by the Neurobehavioral cognitive status examination also known as the Cognistat (Kiernan, Mueller, Langston, Van Dyke, 1987). According to Korner- Bitensky et al., (2011) assessments that were rarely mentioned within the treatment for post-stroke patients, but are known by the occupational therapy profession include: the Behavioral Assessment of the Dysexecutive Syndrome (BADS) (Wilson et al., 1996), the EXIT-25 (Royall, Mahurin & Gray, 1992) and the Frontal Assessment Battery (Dubois, Slachevsky, Litvan & Pillon, 2000). Due to the impact of executive functioning, it is advised that executive functioning skills be formally assessed and that therapists make use of available assessments (Korner-Bitensky et al., 2011).

Dawson, Gaya, Hunt, Levine, Lemsky and Polatajko (2009) reported the use of the Cognitive Orientation to Occupational Performance approach (CO-OP) with traumatic brain injury (TBI) patients. Within the CO-OP approach, the tools identified by Dawson et al. (2009) for assessing executive dysfunction in the adults with TBI included the Wisconsin Card Sorting Test (Heaton, Chelune, Talley, Kay & Curtiss, 1993) and the

Trail Making Test Part B (Army Individual Test Battery, 1994). These neuropsychological assessments have been used in the past with individuals with traumatic brain injuries and the assessments present adequate psychometrics (Dawson et al., 2009). Anderson, Doble, Merritt & Kottorp, (2010) identify the use of the Assessment of Awareness of Disability (AAD) as an additional tool which assists in measuring the individual's level of self-awareness post-brain injury.

Pickens, Ostwald, Murphy-Pace and Bergstrom, (2010) systematically reviewed the executive function literature to evaluate the psychometric properties of executive functioning measures used with adults with and without cognitive impairments. The following evidence-based assessment tools for testing executive functioning were identified: Cognitive Change Checklist (3CL) (Schinka, Brown & Proctor-Weber, 2009); Computer Administered Neuropsychological Screen for Mild Cognitive Impairment (CANS-MCI) (Tornatore, Hill, Laboff, 2005); Executive Personal Finance Scale (EPFS) (Spinella, Yang & Lester, 2007); Random Number Generator Task (RNG) (Ginsburg & Karpiuk, 1994); Test of Practical Judgment (TOP-J) (Rabin, Borgos, Saykin, Wishart, Crane, Nutter-Upham & Flashman, 2007); and the Dysexecutive Questionnaire (DEX) (Burgess, Alderman, Emslie, Evans, andWilson, 1996). Pickens et al. (2010) concluded that many of the assessments addressed were identified as useful in treatment, however further reliability and validity testing was recommended. A tool that assesses all areas of executive functioning is needed in order to gain greater knowledge of the individuals overall executive functioning ability; Pickens et al. (2010) noted that in the ideal situation, a single comprehensive executive functioning tool would be utilized and assist

the assessment process. Having a universal tool would allow the therapist to not rely on multiple tools for assessing executive functioning skills.

Work Environment

According to Braveman and Page (2012) "Occupational therapy service delivery involves facilitating interactions between the client and the domain aspects relevant to the client's cultural context in order to help the client reach the desired health outcomes return to work goals, or alternative vocation goals"(p.69). While assessment of higher level cognitive functions in relation to work is best achieved using performance based assessments (Wolf & Dodson, 2012) , work environment assessment tools allow for evaluation of current functioning level and client centered intervention planning (Braveman & Page, 2012). Environmental factors to assess noise, light, temperature, work surface heights, equipment/tools and psychosocial factors (Braveman & Page, (2012). In addition to the environmental factors of the environmental context, Braveman and Page (2012) identify the psychosocial aspects of work as the individual's values, interests, work role, work habits, perception of work environment and the motivation to work.

There are existing work-related assessments being used within Occupational Therapy including the following assessments. The Work Environment Impact Scale (WEIS) (Moore-Corner, Kielhofner & Olson, 1998) is utilized as an assessment to allow the individual and therapist to identify environmental characteristics that facilitate successful employment experiences. The Worker Role Interview (WRI) (Braveman, et al., 2005) obtains information about the individual's return to work for those with physical and psychosocial diagnoses and assists in determining an individual's readiness,

acceptance and ability to return to work (Braveman & Page, 2012). The Dialogue about Ability Related to Work (DOA) assessment tool is used to determine the factors that impact the individual's work ability (Norrby & Linddahl, 2006). The DOA's population base is with individuals who are experiencing psychiatric and psychosocial problems (Lee & Kielhofner, 2009). The Assessment of Work Performance (AWP) (Sandqvist, Tornquist, & Henricksson, 2006) is an observational assessment designed to assess the individual's working skills in three areas: motor skills, process skills, and communication and interaction skills. The AWP determines how efficiently and appropriately the client performs a work activity; this assessment is considered to have good construct validity and supporting evidence (Lee & Kielhofner, 2009).

Summary

The rural agriculture population is unique in the culture, work demands and duties, values and beliefs, as well as the delineation of work and home life. In order to effectively serve the needs of this population, understanding of the context-specific evaluation of rural agriculture worker's occupational performance and the executive functioning skills required for success in the workplace is required. Although attention (within healthcare literature) has been directed toward the needs of the rural agriculture population in general, attention to the specific duties and skills performed within the rural farm/ranch workplace has not been addressed. Specifically, the impact that executive function deficits have on rural agriculture work duties of farmers and ranchers is missing in literature.

Further, the literature clearly demonstrates cultural differences within this population and their engagement in farming and ranching (Friesen, et al., 2010; Hartley et

al., 2007). The literature also suggests that current assessment instruments utilized in mental health may not be appropriate for assessing the mental health of a farmworker (Grywacz, Alterman, Muntaner, Gabbard, Nakamoto & Carroll, 2009). The lack of tools to support occupational therapists' work with rural agriculture farmers and ranchers and the executive functioning skills needed to complete their workplace duties limits the services occupational therapists (OT) have to offer.

The intent of this scholarly project is to provide a guide for OTs working with the rural agriculture population. The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers seeks to identify and analyze the common duties of the rural agriculture farmer or rancher in relation to associated executive functioning skills and client factors of greatest concern. The occupational therapist's assessment and intervention of executive functioning skills should be directed by The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers to foster client-centered practice which meets the occupational performance needs of the individual.

CHAPTER III

METHODOLOGY

A literature review was conducted to understand the influence of executive functioning skills on engagement within occupational duties and tasks of rural agriculture workers. Literature was located through a variety of resources including the University of North Dakota Harley French Library, internet searches, occupational therapy textbooks and Agra-ability literature. Specifically, internet searches utilized search engines such as OT Search, Google Scholar, PubMed, AccessMediciine, CINAHL, Cochrane, DynaMed, MD Consult, Psychiatry Online, PsychInfo, RefWorks, and SCOPUS. Peer-reviewed journals focusing on work, psychiatry, agriculture, and cognition were of particular interest to this project, including the American Journal of Occupational Therapy, the Canadian Journal of Occupational Therapy, the Journal of Agromedicine, and the Journal of Rural Health.

The literature review resulted in descriptions of key executive functioning skills, duties common to the rural agriculture worker, and information describing the culture of the rural agricultural workers. The topic of executive functioning skills was further searched specifically in the national and international occupational therapy literature to better understand the relationship of executive functioning skills in relation to daily occupations.

The development of the Guide to Assessment of Executive Functioning of Rural Agriculture Workers was based on the specific cultural needs of the agricultural worker

as reviewed in the literature. Literature provided statistical information regarding agricultural workers' injury rates in the United States. A search for current cognitive assessments used within occupational therapy was also conducted in the literature review. There were no cognitive assessments specifically directed towards the agricultural worker. There was also limited research on the cognitive needs specific to agricultural workers.

Multiple occupational therapy models were considered and evaluated to determine the appropriate fit for the scholarly project. Based on the importance of the environment and spiritual aspect of the rural agriculture population, the Person Environment Occupation Model (PEO) (Law, Cooper, Strong, Rigby, & Letts, 1996) was chosen to guide the product development process. The emphasis of environmental constructs reflects the relationship between rural agricultural workers and their engagement in daily occupation. The close relationship that the rural agriculture population has with the land presents a spiritual aspect that is unique to this population. Work and lifestyle are often closely associated and therefore work is considered much more than a source of income. Also when assessing the client, the PEO model assesses the affective component of the client and reflects the client's level of independence and self-awareness, both of which are important for the rural agriculture worker. Self-awareness is particularly important as a function of the individual's cognitive ability to self-perceive abilities and limitations impacting occupational performance.

To develop the Guide to Assessment of Executive Functioning of Rural Agriculture Workers, the duties and tasks common to the agriculture worker were first retrieved from the Occupational Information Network (O*NET) to provide a thorough

and easy to understand description of the duties. Client factors as defined in the *American Occupational Therapy Practice Framework: Domain and Practice* (2008) were matched with the associated duties and tasks of farmers and rancher. The O*NET duties of the rural agricultural worker were then matched to the executive functioning skills and occupational therapy client factors identified in the literature review. A narrative discussing cultural components of rural agricultural workers' everyday life included a summary review of values and beliefs, injury rates, and common duties of rural agricultural workers as reflected in the professional literature. Also included in the project was a case illustration to demonstrate the use of the guide and overarching theory.

The goal of the scholarly project was to create a product that was accessible and easy to use by occupational therapists working with agricultural workers with potential cognitive impairments. It is believed that by creating a culturally relevant guide, the guide will be integrated within the occupational therapy process and allow for a more successful and client orientated focus in therapy.

CHAPTER IV

PRODUCT

Purpose of Guide

The purpose of the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers is to provide a resource for occupational therapists working with individuals from rural agricultural areas. Individuals within the rural agricultural population who experience executive functioning deficits are often at extreme risk for injury due to the nature of their work involving large machinery and livestock. The guide addresses the common duties of rural agricultural farmers and ranchers and the executive functioning skills needed to complete these duties. Client factors as identified in the Occupational Therapy Practice Framework: Domain and Process (American Occupational Therapy Association, 2008) that are essential for the completion of successful occupational performance are incorporated, as well. The intent of the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers is to provide occupational therapists with a guide to ensure a client-centered focus when addressing the cognitive skills and needs specific to individuals living and working within a rural agricultural context.

PEO Model

The occupational therapy model utilized in the formation of the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers is

the Person-Environment-Occupation (PEO) model (Law et al., 1996). This is a client-centered model that focuses on the interaction between person, environment, and occupation (Law et al., 1996). The model also addresses the needs of an individual across their lifespan (Strong& Rebeiro Gruhl, 2011). Within the model, the individual is defined as an integration of spirituality, social and cultural experiences and observable occupational performance components (Law et al., 1996). The environment is described as the context in which the person's occupational performance occurs. This view of the environment includes direct influences, such as family, while also incorporating institutional aspects such as state regulation and transportation systems (Strong & Rebeiro Gruhl, 2011). The PEO model emphasizes the influence which the environment has on an individual and occupational performance (Strong & Rebeiro Gruhl, 2011). A person's occupation is any activity or task in which a person might engage within various roles. The interaction of the person, environment, and occupation results in a measure of occupational performance (Law et al., 1996). Table 4 presents the strengths and challenges of the person, environment, and occupation related to rural agricultural farmers and ranchers.

Table 4:
Strengths and Challenges of P-E-O Components Related to Agriculture Farmers and Ranchers

Person Component	
Physical	• Being on your feet for extended periods of time • Heavy lifting • Daily exercise • Sitting in machinery for long amounts of time • Long hours
Affective	• Stress from internal influences (feelings of failure, pressure of society etc) • Stress from external influences (weather, markets, employees, finances etc) • Dealing with the unpredictability of equipment and livestock • Flexibility with job duties and time frames

	• Stress of relationships
Cognitive	• Long hours • Increased time with families is available • Need to plan ahead • Constant problem solving needed to successfully manage a farm/ranch • Challenging and rewarding lifestyle • Precision needed for tasks requiring detail such as fixing machinery • Attention to task at hand especially when working with animals • Self-awareness of limitations, barriers, skills, and self-values. • Working memory (short and long term) • Able to control responses to outside influences • Orientation to environment • Multi-tasking, there are often many duties/tasks that need completed • Self-motivated to complete tasks autonomously, being your own boss • Sequencing tasks to be most efficient with time • Organization of materials and self
Spiritual	• Traditional family values • Strong work ethic • Respect of the land and animals • Pride in one's land and self • Connection between hard work and reward • Value independence
Environment Component	
Cultural	• Responsibilities on the farm/ranch • Traditional gender roles • Privacy, isolation if location • How the family deals with the stressors of working and living together on the ranch • Traditional family values • Increased responsibilities • Conservative lifestyle; understand the variations and unpredictability of income • Close relationship with community
Physical	• Rural location • Uneven surfaces • Fresh air • Climate exposure • Weather • Multi-purposed buildings • No public transit • Variable road conditions

Institutional	• Lack of resources such as grocery or supplies • Lack of health care services • Invested in community • Limited alternative job opportunities
Social	• Distance potentially limits engagement in community (isolation) • Inherent commitment within the cultural values to assist neighbors when called upon • Known throughout the community
Occupation Component	
• Individual explains the farm/ranch duties that they would like to engage in • Therapists examines the person-context-duties to determine the requirements necessary for engagement • Skills necessary for completion of duties are discussed between therapist and individual	

The rural agricultural-based individual presents some unique differences to those in urban settings. A great deal of value is placed on the land in which the ranch or farm is developed along with the long hours and dedication of the ranch/farm family (Rosmann, 2008). There is little distinction between the working hours of this population and their lifestyle as a whole. Living in a rural setting not only affects the dynamics of work and but also the social aspect. The areas of concern communicated by the individual and their support systems assist the therapist in understanding the person and remain client-centered within practice. Individuals who live in rural settings tend to be independent in their needs, but also rely on the community when support is needed (Raish & McSweeney, 2003). In regards to seeking medical attention, there is the tendency of rural agriculture to be self-reliant and individualistic, which may be part of the culture as well as lack of resources readily available.

Due to the work and living environment of the rural agricultural population, contextual factors play a large role in determining the ability of an individual to successfully complete their occupational performance tasks (Smallfield & Anderson, 2008). It is not uncommon within the culture of rural agriculture for there to be an

exchange of help between neighbors when one is in need. The communities within rural agriculture understand the personal and small business characteristics of rural agriculture work and can therefore offer their support. Farmer/rancher success is highly dependent on the individuals' understanding of the agriculture market in terms of buying and selling produce or livestock. Environmental factors such as weather, economic trends and legislation all influence occupational performance. Extreme weather-related events such as heat waves, cold snaps, severe storms, flooding, and drought can affect crop yields and livestock health and performance (National Oceanic Atmospheric Administration, 2010). The selling price for which produce and livestock are sold, is dependent upon the selling and buying trends within state, national, and local prices. Legislation may influence the market in regards to the transfer of produce and livestock across national borders, therefore affecting their value.

Another environmental aspect of an individual living and working within a rural agriculture context is the distance to and from needed resources such as medical facilities as well as schools, ranch supply stores and banks. The distance may cause the individual and community to adjust, modify, and plan ahead in order to meet their needs. Due to this rural characteristic, a different set of routines may exist, such as borrowing from neighbors, purchasing items in large quantities and possibly seeking medical treatment from a local resident. The lack of resources available to this population not only affects their daily routines but also the populations' options for employment. There is often a push to keep ranches/farms within the family, putting an expectation on chosen occupations of family members. When individuals are expected to take over the ranch/farm, little to no formal education is sought. Although the opportunity to continue

the family tradition is valued, there is little opportunity for the individual to engage in other occupations.

"Occupations place affective, cognitive and physical demands on the individual performing the occupation" (Strong & Rebeiro Gruhl, 2011, p. 33). The affective demands of a rural agriculture worker may include stress from external and internal influences. The desire to uphold the family ranch or farm may put increased pressure on the individual to effectively manage and maintain the family tradition. Stress of the unknown factors such as weather, production rates as well as costs and income tend to have varying rates from year to year. Specifically, individuals within the rural agriculture population must be able to problem solve and process the importance of cause and effect such as dealing with an outbreak of disease among produce and livestock. There is a need within this culture and environment to have the skills to be able to plan ahead in terms of purchasing adequate amounts of supplies. Farmers and ranchers must also have the skill to identify areas of need, as well as foreseeing potential areas for growth within the ranch or farm to enable future growth.

Within this population, time spent working is not directly related to the amount of income that rural agriculture workers will receive. Farmers or ranchers often work 12 plus hour days but often always need more time to work. Time management as well as attention to tasks is highly valued within the population. Production rates as well as the accuracy and attention to tasks can make a process run smoothly, or lack of attention can result in further unnecessary work to be needed and working time to be lost. Individuals must have the cognition to understand the vast safety risks when working in rural agriculture. The majority of the working time is spent with machinery and livestock,

which are often unpredictable, therefore increasing risk for injury. Attention, reasoning and critical thinking of the rural agriculture worker when engaging in livestock and machinery duties assists in increasing efficiency while also decreasing accidents, and injury to workers. Occupations within the PEO model are identified as being meaningful to the individual. The differentiation of work and life of a rural agriculture worker presents little to no separation, stressing the importance of occupational performance and engagement within one's duties (Young, Murphy 1998).

How to Use the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers

The PEO model provides structure to the therapist in understanding the individual and the influences on their ability to engage within their environment and in their occupation (Strong& Rebeiro Gruhl, 2011). The occupational therapist will first obtain information about the person and environment through the initial evaluation. Information regarding the context of the individuals' life and work environment including direct influences such as family and community should be addressed. Once this information is gathered and the occupational therapist has formed a greater understanding of the individual, the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers will be utilized in identifying the occupations and duties in which the individual engages in regularly. Within the guide, the individual is provided with a list of possible duties that may be a part of their responsibilities on the ranch/farm. Together the occupational therapist and the individual identify the duties that are most relevant to the individuals' line of work and that assist the individual in returning to engagement in desired occupations. Within the guide, the duty descriptions are listed using a numerical system to assist therapists in documenting as well as when working

with other healthcare professionals. Instead of having to recite the exact description of the duties identified by the individual, the therapist can refer to them as the correlated numbers, creating a simplified communication technique.

The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers provides structure for the occupational therapist toward recognizing the executive functioning skills and client factors associated with the occupations and duties most relevant to the rural agriculture population. The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers provides the top duties of farmers and ranchers as recognized by O*NET (2010) to assist the individual in identifying their areas of occupational performance. By recognizing the essential executive functioning skills within the guide, the therapist is better able to serve the needs of the rural agriculture worker and enable this population to engage in their unique occupation and lifestyle.

Duties

The duties of a ranch/famer within the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers were selected from O*NET (2010), as this source utilizes common language to describe occupations. The easy to read descriptors and the detail of each duty will provide the therapist and individual with a wide range of agricultural tasks to choose from when determining areas of occupation important to the individual. The job description of one rancher/farmer to the next differs therefore the list encourages self-awareness when selecting duties of engagement in occupational performance. As the therapist and individual create goals

based on the duties in which the individual would like to resume, there is an increase rapport as well as client-centered practice.

Executive Functioning Skills

For the purpose of this guide, executive functioning skills are defined as the skills necessary for an individual to engage in occupations safely and efficiently. Emotional responses as well as the use of metacognition and coordination of cognitive components result in this higher order of thinking. The executive functioning skills as identified by Matheson (2011) are utilized within the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers as to provide the user with a thorough understanding of the components of executive functioning in accordance to the duties specified by the individual. Executive functioning skills enable the agriculture worker to be engaged within the contextual demands determined by rural agriculture work and lifestyle. Executive functioning within the agriculture context allows the worker to engage in the task at hand as well as make the appropriate preparations and accommodations for the future. The process of executive functioning is the integration and coordination of basic cognitive skills.

Client Factors

According to the American Occupational Therapy Framework: Domain and Process, client factors are described as "specific abilities, characteristics, or beliefs that reside within the client and may affect performance in areas of occupation" (American Occupational Therapy Association, 2008, p. 630). The use of the client factors within the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers are specific to the mental

functions of the individual. The presence or absence of illness, disease, deprivation and disability impact client factors therefore influencing occupational performance (American Occupational Therapy Association, 2008). Specifically the mental functions address the individuals affective, cognitive and perceptual skill sets. This portion of the guide allows the therapist to identify the potential areas of cognition impacted by executive functioning deficits and implement further assessment and intervention appropriately.

Table 3:

Occupational Therapy Guide for Assessment of Executive Functioning of Rural Agriculture Workers

Duties and Tasks (O*NET, 2010)	Executive Functioning Skills	Client Factors Mental Functions
1) Determine types or quantities of crops or livestock to be raised, according to factors such as market conditions, federal programs or incentives, or soil conditions.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Initiation • Working Memory • Plan and Maintain Organization	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation
2) Direct crop production operations, such as planning, tilling, planting, fertilizing, cultivating, spraying, or harvesting.	• Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Thought • Consciousness • Orientation • Energy and drive
3) Direct the breeding or raising of stock, such as cattle, poultry, using recognized breeding practices to ensure stock improvement and market value.	• Impulse Inhibition • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive

4) Evaluate marketing or sales alternatives for farm or ranch products.	• Impulse Inhibition • Cognitive Flexibility • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Thought • Consciousness • Orientation • Temperament and personality
5) Hire, train, or supervise workers engaged in planting, cultivating, irrigating, harvesting, or marketing crops, or in raising livestock.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Mental functions of sequencing complex movement • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
6) Inspect farm or ranch structures, such as buildings, fences, or roads, ordering repair or maintenance activities, as needed.	• Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive
7) Maintain financial, operational, production, or employment records for farms or ranches.	• Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive
8) Monitor activities such as irrigation, chemical application, harvesting,	• Impulse Inhibition • Working Memory • Plan and Maintain	• Higher level cognitive • Attention • Memory

milking, breeding, or grading to ensure adherence to safety regulations or standards.	Organization • Task Monitor	• Perception • Thought • Consciousness • Orientation • Temperament and personality • Energy and drive
9) Monitor pasture or grazing land use to ensure that livestock are properly fed or that conservation methods, such as rotational grazing, are used.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation • Temperament and personality • Energy and drive
10) Negotiate with buyers for the sale, storage, or shipment of crops or livestock.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
11) Obtain financing necessary for purchases of machinery, land, supplies, or livestock.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Plan and Maintain Organization • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality

		• Energy and drive
12) Operate or oversee the operations of dairy farms that produce bulk milk.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Temperament and personality • Energy and drive
13) Operate or oversee the operations of farms producing meat, eggs, or breeding stock.	• Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation • Temperament and personality • Energy and drive
14) Plan crop activities based on factors such as crop maturity or weather conditions.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation • Temperament and personality • Energy and drive
15) Prepare budgets or financial reports for farm or ranch operations.	• Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Temperament and personality

		• Energy and drive
16) Select or purchase machinery, equipment, livestock, or supplies, such as seed, feed, fertilizer, or chemicals.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation • Temperament and personality • Energy and drive
17) Supervise the construction of farm or ranch structures, such as buildings, fences, drainage systems, wells, or roads.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
18) Analyze market conditions to determine acreage allocations.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Working Memory • Plan and Maintain Organization	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Consciousness • Orientation • Energy and drive
19) Analyze soil to determine types or quantities of fertilizer required for maximum crop production.	• Cognitive Flexibility • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive

20) Buy or sell futures contracts or price farm products in advance of future sales to minimize risk or maximize profits.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
21) Demonstrate or explain working techniques, practices, or safety regulations to farm or ranch workers.	• Impulse Inhibition • Cognitive Flexibility • Emotional Control • Self-Awareness • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Mental functions of sequencing complex movement • Emotional • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
22) Direct livestock or crop waste recycling operations.	• Impulse Inhibition • Cognitive Flexibility • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Thought • Consciousness • Orientation • Energy and drive
23) Inspect farm or ranch equipment to ensure proper functioning.	• Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Mental functions of sequencing complex

		movement • Consciousness • Orientation • Energy and drive
24) Inspect orchards or fields to determine crop maturity or condition or to detect disease or insect infestation.	• Cognitive Flexibility • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive
25) Monitor and adjust irrigation systems to distribute water according to crop needs and to avoid wasting water.	• Cognitive Flexibility • Self-Awareness • Initiation • Plan and Maintain Organization • Task Monitor	• Higher level cognitive • Attention • Memory • Perception • Thought • Experience of self and time • Consciousness • Orientation • Temperament and personality • Energy and drive
26) Plan and direct development or production of hardier or higher-yield hybrid plant varieties.	• Impulse Inhibition • Cognitive Flexibility • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive
27) Replace chemical insecticides with environmentally friendly practices, such as adding pest-repelling plants to fields.	• Cognitive Flexibility • Initiation • Working Memory • Plan and Maintain Organization • Task Monitor • Organization of Materials	• Higher level cognitive • Attention • Memory • Perception • Thought • Consciousness • Orientation • Energy and drive

After obtaining client information, identifying the duties, associated executive functioning skills, and client factors, the therapist is ready to select the most applicable cognitive assessment. The selection of assessments should address the direct needs of the individual; the therapist evaluates executive functioning deficits in the areas specified. The glossary is a reference for the occupational therapist in determining the most appropriate assessment to match the needs of the individual. The glossary consists of the name of the assessment, a description detailing the aspects of the assessment as well as a source for location of the assessment. The glossary is not an exhaustive list of all executive functions but rather provides the assessments that are supported by executive functioning literature. The list of assessments can be found in the glossary.

Case Study Illustration

John C. is a 43-year old male who raises cows and runs a small alfalfa operation on a ranch in Wyoming. He grew up on his parent's ranch and went to college for two years before taking over the ranch when his father passed away. John and his wife have lived on the ranch for more than 17 years. They have a 15-year-old son and a 10-year-old daughter. John had been working in the fields when his tractor rolled over, crushing him within it. When he did not return home, his wife and son went looking for him and found him unconscious and with injuries including lacerations to his head.

John was later admitted to the hospital where it was later determined that he had a traumatic brain injury to his frontal lobe. After 10 days in the hospital, John was at a Rancho Level 6 and was referred to the inpatient occupational therapy department for further evaluation. The therapist performed the Canadian Occupational Performance Measure (COPM) (Law, Baptiste, Carswell, McColl, Polatajko & Pollock, 2005). John

identified his top five performance issues; return to work on the ranch was his main priority, a productivity component of the COPM. John communicated feelings of concern pertaining to his ability to operate the machinery on the ranch. At this point, the therapist introduced the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers to John. The therapist communicated to John that the purpose of the guide was to assist in identifying Johns cognitive needs for returning to work on the ranch. John was asked to identify and prioritize the duties he would most like to be able to perform. John identified duties 2, 14, 23 and 24 as being the tasks in which he needs and wants to engage in when he returns to the ranch. The therapist discussed the choices made with John to get a better understanding of why these duties are essential to him.

The therapist then utilized the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers to address the executive functioning skills that are required for the completion of the duties. The therapist then prioritized the executive functioning skills that are most prevalent between the tasks. The common executive functioning skills found amongst the duties identified included cognitive flexibility, initiation, working memory, plan and maintain organization as well as task monitoring. Using the assessment glossary and the list of executive functioning skills needed to be evaluated, the therapist selected the Behavioral Assessment of Dysexecutive Syndrome (BADS) (Wilson, Alderman, Burgess, Emslie, and Evans 1996). This assessment is sensitive to the capacities affected by frontal lobe damage, emphasizing temporal judgment, cognitive flexibility and inhibition of response, practical problem solving, strategy formation, ability to plan, and task scheduling (Wilson et al., 1996) .

The BADS will provide the therapist with information to utilize for intervention planning.

Below is the illustration of the PEO Model utilized by the therapist to direct the therapy process. To illustrate the relationship between the person, environment and occupation, only one of John's identified duties was explained below. John identified duty number 2 as being an area of concern for him. Within the guide the duty is defined as directing crop production operations, such as planning, tilling, planting, fertilizing, cultivating, spraying, or harvesting (O*NET, 2010).

John's Occupational Performance Issue • John has feelings of concerns pertaining to his ability to work the machinery on the ranch.		
Assessment of Main Components		
Person (affective, cognitive, physical, spirituality)	**Environmental Conditions (cultural, institutional, physical, social)**	**Occupational Demands (affective, cognitive, physical)**
• Limited copying strategies • Stress from feelings of failure • External Stressors such as land needing to be cultivated • Impaired planning • Impaired problem solving • Highly motivated • Decreased self-awareness • Decreased	• Stress on family dynamic • Viewed as head of the household • Lives in a rural location with variable road conditions • Neighbors have offered their help with the ranch • Long distance from any hospital • Lack of alternative job opportunities in the area • Strong family support • Work with large machinery and livestock	• Duties are physically and mentally demanding • Long hours of work • Duties require attention and concentration to avoid injury and errors • Problem solving is essential when working with machinery

Safety awareness • Feels helpless		
Assessment of PEO Transactions		
Person-Occupation (P x O)	**Occupation-Environment (Ox E)**	**Person-Environment (P x E)**
• Values work • Knowledge base matches work duties • Low safety awareness when working with machinery • Limited copying skills when dealing with family stress • Impaired problem solving affects his ability to work independently	• Neighbor support provides additional assistance with completion of tasks on ranch • John has deficits in cognitive skills and direct care is not available if an accident were to happen • Family income is dependent on the revenue from the ranch • Specific tasks on the ranch require Johns skills to complete • John is highly motivated toward working long days	• Due to rural location and planning abilities are impaired, efficiency of purchasing goods is decreased • John presents lack of safety-awareness therefore impacting his ability to work with large machinery and livestock • Due to deficits in planning, action to avoid negative impacts on land from weather may be impending
Interventions/Strategies to Improve Occupational Performance		
• John and his OT will identify potential environmental stressors and ways to manage the stress in an appropriate manner • Provide John with home program activities to increase cognition • Discuss with the family what can be expected of John in the future • Ease John's mind about providing for the family by bringing in supports from his community • Explore things John can do to feel better prepared to return home, determine aspects of his occupation that he can take over and feel some aspect of control, and identify the choice he can make.		

Glossary of Assessments

Assessment Title	Description	Location/Additional Information
Executive Functioning Performance Test (EFPT)	Top-down assessment identifying executive function skills to perform common daily occupations for independent living. 5 components of executive function (EF) are observed as test domains: (1) initiation/starting, (2) organization/setup, (3) sequencing/completing steps in proper order, (4) determining safety/judgment, (5) understanding task is complete. The level of assistance required in each of the 5 components of executive function is measured through a hierarchy of cueing: 0. No cues. 1. Indirect cues 2. Gestures or pointing. 3. Direct cues. 4. Physical Assistance 5. Do for the participant (Baum, Conner, Morrison, Hahn Dromerick & Edwards 2008).	http://www.health.utah.edu/ot/colleagues/evalreviews/efpt.pdf
Kitchen Task Assessment (KTA)	Records the level of cognitive support to complete a cooking task. It can be performed in a clinic or in the person's home. The clinician observes and evaluates the individual's performance with the task completion (Baum & Edwards, 1993).	http://ajot.aotapress.net/content/62/5/528.full.pdf+html
Assessment of Motor and Processing Skills (AMPS)	The AMPS is an observational assessment based on MOHO that is used to measure the quality of a person's performance of domestic (instrumental) or basic (personal) activities of daily living (ADL). The quality of the person's ADL performance is assessed by rating the effort, efficiency, safety, and independence of 16 ADL motor and 20 ADL process skill items (Fisher, 2003).	http://www.ampsintl.com/AMPS/manual/manual.php
Allen's Cognitive Levels Test Battery (ACLS)	The purpose of the screen is to obtain a quick measure of global cognitive processing capacities, learning potential, and performance abilities and to detect unrecognized or suspected problems related to functional cognition. It is comprised of three visual -motor tasks (leather lacing stitches) with increasingly complex activity demands. Completion of the three tasks requires that the person attend to, understand, and use sensory and motor cues from the material objects (leather, lace and needles), administrator's verbal and demonstrated instructions and cues, and feedback from motor actions while making the stitches. The scores obtained are interpreted using the Allen Cognitive Scale of levels and modes of performance. The screen is available in two forms: a standard ACLS-5 and a larger form LACLS-5 for persons with vision or hand function problems (Allen, Earhart, & Blue, 1992).	http://www.allencognitivelevelscreen.org/PDF/Web10_ACLS-5Handout2pages.pdf
Tower of London-Drexel University (TOL DX)	The TOLDX measures executive planning that involves the ability to conceptualize change, respond objectively, generate and select alternatives, and sustain attention. The examiner and examinee each have identical towers and the examinee is asked to match bead configurations that the examiner presents (Culbertson & Zillmer,2005).	http://www.ericzillmer.com/tests_tower.htm
Mini Mental State Exam	• The MMSE consists of 11 simple questions or tasks grouped into 7 cognitive domains	http://www.rehabmeasures.org/lists/rehabmeasure

(MMSE)	o Orientation to time o Orientation to place o Registration of three words o Attention and calculation o Recall of 3 words o Language o Visual construction. • A possible score of 30 is used to provide a picture of an individual's present cognitive performance based on direct observation of completion of test items/tasks. • A score of <24 is the generally an accepted cutoff indicating the presence of cognitive impairment • Levels of impairment have been classified as: o None: score = 24-30 o Mild: score = 18-24 o Severe: score = 0-17 (Folstein, Folstein & McHugh, 1975)	s/dispform.aspx?id=912
Cognitive Competency Test (CCT)	Samples a wide range of cognitive skills that are reality based. The 12 subtest include: personal information, card arrangement, picture interpretation, memory (immediate & delay), practical reading skills, management of finances, verbal reasoning, rout learning and directional orientation (list, locate, orientation, path finding) (Tupper & Cicerone, 1990).	http://libguides.lib.umanitoba.ca/content.php?pid=195530&sid=1840063
Behavioral Assessment of the Dysexecutive Syndrome (BADS)	The BADS specifically assesses the skills and demands involved in everyday life. It is sensitive to the capacities affected by frontal lobe damage, emphasizing those usually exercised in everyday situations: temporal judgment, cognitive flexibility and inhibition of response, practical problem solving, strategy formation, ability to plan, and task scheduling (Wilson, Alderman, Burgess, Emslie, & Evans,1996).	http://pearsonassess.ca/haiweb/Cultures/en-CA/Products/Product+Detail.htm?CS_ProductID=749129050&CS_Category=ot-cognitive-functioning&CS_Catalog=TPC-CACatalog
Wisconsin Card Sorting Test	Four stimulus cards incorporate three stimulus parameters (color, form, and number). Respondents are required to sort numbered response cards according to different principles and to alter their approach during test administration. To complete the task, clients should have normal or corrected vision and hearing sufficient to adequately comprehend the instructions and to visually discriminate the stimulus parameters (Heaton, Chelune, Talley, Kay & Curtiss, 1993)	http://www4.parinc.com/Products/Product.aspx?ProductID=WCST
Trail Making Test	The Trail Making Test consists of 25 circles distributed over a sheet of paper. In Part A, the circles are numbered 1 – 25, and the patient should draw lines to connect the numbers in ascending order. In Part B, the circles include both numbers and letters and the patient draws lines to connect the circles in an ascending pattern, but with the added task of alternating between the numbers and letters as indicated. The patient should be instructed to connect the circles as quickly as possible, without lifting the pen or pencil from the paper. It is unnecessary to continue the test if the patient has not completed both parts after five minutes have elapsed (Reitan,1992).	http://doa.alaska.gov/dmv/akol/pdfs/uiowa_trailmaking.pdf

Assessment of Awareness of Disability (AAD)	Based on a semi-structured interview and used in conjunction with the Assessment of Motor and Process Skills (AMPS).The AAD also takes into consideration cultural aspects in the evaluation of awareness of limitation of performance. The AAD was developed to be used by occupational therapists with a client-centered and top-down approach in intervention planning. The AAD can be used to identify areas in occupational performance the client is aware of, and give important information for selecting, planning and implementing different intervention strategies. The AAD may also be used for measuring improvements in awareness of disability over time (Kottorp, 2012)	http://www.ampsintl.com/AMPS/related/AAD.php
Cognitive Change Checklist (3CL)	Comprised of four scales titled memory, executive, language, and remote recall (Schinka, Brown, & Proctor-Weber, 2009).	http://www.ncbi.nlm.nih.gov/pubmed/19461260
Computer Administrated Neuropsychological Screen for Mild Cognitive Impairment (CANS-MCI)	The CANS-MCI test battery measures a person's cognitive skills in memory, symbol fluency and executive function. It test the following areas: Orientation to Touching; Word-to-Picture Matching; Immediate Free and Guided Object Recall; Design Matching; Clock Hand Placement; Stroop; Picture Naming; Delayed Free and Guided Object Recall (Wild, Howieson,Webbe, Seelye & Kaye, 2008).	http://www.screen-inc.com/index-5.php
Executive Personal Finance Scale (EPFS)	The EPFS is a 20-item, likert scale, self-rated measure to assess executive aspects of money management as prefrontal systems are involved in this function (Spinella, Yang & Lester, 2007).	http://www.ncbi.nlm.nih.gov/pubmed/18232424
Test of Practical Judgment (TOP-J)	The Test of Practical Judgment (TOP-J) was developed to objectively test judgment in older adults using open-ended questions.13 Specifically, the measure evaluates domains of judgment in relation to safety, medical, social/ethical and financial aspects of EF (Rabin, Borgos, Saykin, Wishart, Crane, Nutter-Upham & Flashman, 2007).	http://link.springer.com/article/10.1007%2Fs11682-009-9063-6?LI=true
Dysexecutive Questionnaire (DEX)	Designed to sample a range of problems such as emotional or personality changes, motivational changes, behavioral changes, and cognitive changes. The DEX comes in two formats: patient and caregiver (Burgess, Alderman, Emslie, Evans & Wilson, 1996).	http://pearsonassess.ca/haiweb/Cultures/en-CA/Products/Product+Detail.htm?CS_ProductID=749129050&CS_Category=ot-cognitive-functioning&CS_Catalog=TPC-CACatalog
Worker Environment Impact Scale (WEIS)	The WEIS identifies environmental characteristics that facilitate successful employment experiences as well as factors that inhibit worker performance and satisfaction and which may require accommodation. The WEIS is a semi-structured interview and rating scale designed to assist the therapist to gather information on how individuals with physical or psychosocial disabilities experience and perceive their work environments. Typical candidates for this assessment are persons who are experiencing difficulty on the job, and persons whose work is interrupted by an injury	http://www.uic.edu/depts/moho/assess/weis.html

	or episode of illness. The 17 items reflect the social and physical environment, supports, temporal demands, objects used, and daily job functions (Braveman & Page, 2012).	
Worker Role Interview (WRI)	The WRI was developed to address psychosocial and environmental factors that impact return to work. The WRI is a semi-structured interview designed as the psychosocial/environmental component of the initial rehabilitation assessment process. The new WRI 10.0 has three interview formats: one for workers with recent injuries/ disabilities, for clients with chronic disabilities, and a combined WRI and OCAIRS interview (Braveman & Page, 2012).	http://www.uic.edu/depts/moho/assess/wri.html
Dialogue about Ability Related to Work (DOA)	This instrument is divided into two sections; client self-assessment and professional assessment focusing on the individual's ability to perform work-related activities. Assessments are then followed by a dialogue to distinguish goals for the process of returning to work based on the client's preferences (Linddahl, Norrby & Bellner, 2003).	http://iospress.metapress.com/content/5g2gk21kx83kbmp8
Assessment of Work Performance (AWP)	The AWP assesses an individual's observable, work-related skills. The AWP assesses three skill domains: motor skills, process skills, and communication and interaction skills. These three domains contain 14 skill items: 5 in the domain of motor skills, 5 in the domain of process skills, and 4 in the domain of communication and interaction skills. The 14 skills are rated on a four-point ordinal rating scale. The AWP can be used to assess the working skills of individuals with various kinds of work-related problems (Lee & Kielhofner, 2010).	http://www.uic.edu/depts/moho/assess/awp.html

CHAPTER V

SUMMARY

The common duties of rural agriculture workers includes but is not limited to a high dependence on executive functioning skills. The Guide to Assessment of Executive Functioning of Rural Agriculture Workers has the potential to assist health care professionals in facilitating the client's successful and safe engagement in occupation-based tasks pertaining to the work and occupations of rural agriculture. By identifying and evaluating specific skills, health care professionals can target the executive functioning needs of their clientele. Use of the guide will better meet the needs of the rural agricultural population and encourage a therapeutic working relationship between the client and therapist.

Limitations and Recommendations

The Guide to Assessment of Executive Functioning of Rural Agriculture Workers was developed to meet a void in the professional literature specific to occupational therapists' assessment of executive functioning in rural agricultural workers. The Guide has not been utilized in occupational therapy practice as yet; therefore the reliability and validity remain untested. The glossary of assessments, located within the appendix, while a useful addition to the Guide, is not an exhaustive list.

The next step in the process of developing and implementing the Guide to Assessment of Executive Functioning of Rural Agriculture Workers is to assess the use of the guide. It is recommended that the guide be utilized within an occupational therapy

practice setting to determine its applicability, utility, and ease of usage. Feedback to support further refinement of the tool should be solicited. The authors would also like research to be conducted in determining the validity of the executive functioning skills matched with the rural agriculture duties. In order to learn more about the direct association and impact of executive functioning on engagement in rural agriculture duties and tasks, further research needs to determine the validity of the proposed executive functioning skills matched with the rural agricultural duties presented.

Conclusion

The purpose of the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agricultural Workers is to assist occupational therapists working with rural agricultural workers to target the duties and executive functioning skills most relevant for rural agricultural workers engaging in occupational work. The Guide provides a definition of 27 duties that are common to the rancher or farmer. The occupational therapist collaborates with the client to determining the duties of greatest priority and to gain a personalized definition of the duties identified. The associated client factors and executive functioning skills are also provided within the guide to give the therapist a greater understanding of the occupational components and direction for choosing an appropriate assessment. Using the information provided within the guide, occupational therapists have a greater understanding of the meaningful activities in which the farmers/ranchers engages and enable a strong client-centered approach.

The Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers is designed to aid occupational therapists in providing client-centered care. The rural agricultural population poses unique within their environment,

culture and job duties. It is proposed that the Occupational Therapy Guide to Assessment of Executive Functioning of Rural Agriculture Workers be implemented with the target population of individuals who live within the rural agriculture context. The simplified descriptions within the guide and ease of use allow the guide to be utilized by any occupational therapists who may or may not be familiar with the target population and within any healthcare setting.

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