

**VOCATIONAL EVALUATION AND
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VECAP



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VECAP Mission

The Vocational Evaluation and Career Assessment Professionals (VECAP) organization is a nonprofit organization originally founded in 1967 to promote the professions and services of vocational evaluation and work adjustment. Formerly known as the Vocational Evaluation and Work Adjustment Association (VEWAA), the name was changed in 2003 to better reflect the focus of the organization as well as emphasize the independent status of the organization. This group has no affiliation with the National Rehabilitation Association (NRA) or the NRA/ VEWAA.

The VECAP organization is committed to advance and improve the fields of vocational evaluation and career assessment and represents the needs of the professionals who provide those services. Its scope of services will encompass individuals who need assistance with vocational development and/or career decision-making.

VECAP is comprised of membership of professionals who provide vocational evaluation, assessment, and career services and others interested in these services.

VECAP members identify, guide, and support the efforts of persons served to develop and realize training, education, and employment plans as they work to attain their career goals.

VOCATIONAL EVALUATION AND CAREER ASSESSMENT PROFESSIONALS JOURNAL

GUIDELINES FOR PUBLICATION

Purpose and Scope:

Vocational Evaluation and Career Assessment Professionals Journal (VECAP) is an official publication of the Vocational Evaluation and Career Assessment Professionals Association. This refereed publication is designed to advance knowledge and practices in the collective fields of vocational assessment, vocational evaluation and work adjustment. The journal provides practitioners, consumers, and educators with an understanding of critical information in vocational assessment and therapeutic adjustment services. It concentrates on the methodology, program innovations, and instrumentation development within the areas of vocational evaluation and work adjustment.

Types of submissions:

The VECAP Journal seeks several types of submissions. The primary interest is research or theoretical based articles that apply to vocational evaluation, career assessment or assistive technology. These articles will typically be between 16-25 pages in length. However, the VECAP journal encourages submissions from practitioners that help us to understand practice or enhance practice. We will also consider book reviews, test or work sample reviews and brief reports regarding initial studies in areas of interest to VECAP members. These later submissions are expected to be 6-10 pages in length.

Review Process:

All manuscripts will be reviewed anonymously by the Editorial Board or invited reviewers who have expertise in a specific topic. Each manuscript must be presented with a single cover sheet that identifies the manuscript title, author's name(s), appropriate credentials, organizational affiliation and contact information (e.g. mailing addresses along with daytime and evening phone numbers). Please note that the author's name and any other identifying information should not appear on subsequent manuscript pages.

Style Requirements: All submissions should meet the following criteria:

- Manuscripts should be submitted electronically, and should be in MS Word or Rich Text Format.
- Manuscripts must be double-spaced in Times New Roman (12 point), Portrait layout, typed on a standard 8.5" x 11" white background, with a 1-inch margin on all sides.
- The title of the manuscript must be on the cover sheet with the name of the author(s) appearing immediately below the title, appropriate credentials, organizational affiliation and contact information (e.g. mailing addresses along with daytime and evening phone numbers).
- The second page should contain the Abstract, with the text starting on the third page. The abstract should be approximately 150 words.
- All pages must be numbered with Arabic numerals in the lower right corner.
- If you are using Tables, they must be typed using Microsoft Word Tables format. Tables should be numbered with Arabic numerals and provided with the titles at the top. Figures should be numbered with Arabic numerals and titled at the bottom.

- Footnotes should be avoided because they disrupt the reader's train of thought and create confusion with references. If the material is important enough for the reader to seek it out, it is important enough to be included in the text.
- Acknowledgements, if any, should be made in a separate section following the Conclusion or Summary section and before the References.
- References use the *alphabetical method*. Only references cited in the text should be listed. (If the material is removed or added, be sure to revise numbering.) Authors should follow the reference style used in the Publication Manual of the American Psychological Association. This manual may be viewed on-line or purchased from the American Psychological Association, APA Order Department, and P.O. Box 92984, Washington, D.C. 20090-2984. Tel.: 800-374-2721; Fax: 202-336-5310. TDD/TDY:202-336-6123. Internet: www.apa.org/books. E-mail: order@apa.org.
- A Biographical Sketch of 200 or fewer words for each author should be submitted *on a separate page* with the manuscript.

Following a preliminary review by the editor, the manuscript will be sent to three members of the editorial board or selected guest reviewers with knowledge of and/or expertise in the author's topic. Upon review, manuscripts will be either accepted or rejected, or returned to the author(s) for suggested revision. Approximately two or three months may elapse between the acknowledgement and receipt of a manuscript and notification of its disposition.

The editor will submit to the author for approval, the article after it has been edited for publication. The author will be advised to make any appropriate corrections and resubmit the article. Accepted articles are published in the order of their receipt.

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Manuscripts failing to adhere to these guidelines will not be accepted. **PAPER MANUSCRIPTS WILL NOT BE ACCEPTED.** Manuscripts should be submitted directly to the editor via email attachment or can be mailed as a CD ROM disc to:

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EDITORIAL

This current issue of the journal includes a number of articles we believe will be of interest and practical utility to vocational evaluation and career assessment professionals. In *Making the Case for Computer Adaptive Testing in Vocational Evaluations*, Byers, Moorhouse, Pomeranz, Spitznagel, and Velozo describe the process of converting a test from paper-and-pencil format to a computer-adapted test (CAT), based on the principles of Item Response Theory. Converting lengthy tests to CAT offers many benefits, such as the potential for more accurate test results, rather than results that may have been adversely affected by fatigue or other disability-related issues. The CAT approach could also increase program efficiency, which becomes increasingly essential with the trend toward shorter evaluation periods.

Boykin and Sligar (*Empowerment in Vocational Evaluation: Moving from Implied to Explicit*) delineate the role of empowerment as the cornerstone of vocational evaluation services and illustrate how professionals can explicitly apply the principles of empowerment throughout the vocational evaluation process.

Functional Vocational Evaluation by Castiglione was prepared as a white paper, based on contributions and feedback by the VECAP Workgroup. In light of changes included in the Individuals with Education Act of 2004, the Workgroup examined the concepts and practices of functional vocational evaluation (FVE); they provide clarity to the definition of FVE in transition services and suggest approaches that could be incorporated with vocational evaluation.

*In Validity of the O*NET Ability Profiler for Use in Comprehensive Vocational Evaluations* Cioe, Bordieri, and Musgrave present their research comparing results of the Ability Profiler and WAIS-III and further identified differences in correlations between the two tests for individuals with orthopedic/health disabilities versus cognitive disabilities. Although the Ability Profiler is intended to replace the widely used General Aptitude Test Battery, data regarding its validity and utility for individuals with disabilities are lacking; the current article provides helpful data for professionals who are considering the Ability Profiler as an assessment tool.

Kubota, Bezyak, Fried, and Ososkie (*Assessment of Executive Function in Rehabilitation*) discuss the concept of executive function, which is important to be aware of when conducting vocational assessments of individuals who are likely to have deficits in these skills. The authors provide a clear description of executive function tasks, their implications for the rehabilitation process, and the impact of specific disabling conditions on executive function. They also review assessment instruments and approaches that can be used to assess executive function and discuss possible intervention strategies.

We thank the current authors for their valuable contributions and appreciate the time and feedback of our reviewers in helping this issue come to fruition. As always, we welcome suggestions and contributions from the VECAP membership. During the upcoming VECAP Forum, we will be giving a presentation on the basics of writing for professional publication and hope to see some of you there!

Debra Homa, Co-Editor
Cari Schmidt, Co-Editor

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MAKING THE CASE FOR COMPUTER ADAPTIVE TESTING IN VOCATIONAL EVALUATIONS

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ABSTRACT

The purpose of this article was to demonstrate the basic process by which a vocational evaluation instrument, currently used in a paper-and-pencil format, can be converted to a computer adaptive test (CAT). This conversion enables only those test items that are at or near the test-taker's ability level to be presented to the person. The advantages of such a conversion to both the consumer and the evaluator include increased test efficiency and reduced evaluator and test-taker burden. Such conditions may be especially beneficial to people with disabilities for which traditional vocational evaluation tests may create barriers to optimal performance.

INTRODUCTION

Social science researchers are utilizing Item Response Theory (IRT) models to measure psychological constructs, such as self-concept, aptitudes, and cognitive abilities, with greater precision and efficiency than was feasible with Classical Test Theory (CTT) techniques (Byrne, 1996; Hambleton, Swaminathan & Rogers, 1991; Rasch, 1960; Vispoel, 1993; Vispoel, 2000; Wright & Masters, 1982; Wright & Stone, 1979). When using Rasch analysis, a one-parameter IRT model, data are converted from ordinal data to an interval scale, and a hierarchical arrangement of items from most difficult to least difficult is established. This ordering of items serves as one mechanism by which items are delivered in a computer adaptive

test (CAT) (Ware, Gandek, Sinclair & Bjorner, 2005; Weiss & Kingsbury, 1984).

A CAT is an innovative technology that systematically tailors items to a person's ability, thereby increasing test efficiency and reducing evaluator and test-taker burden. While traditional assessments generally give the same question set to all test-takers, a CAT individualizes each assessment by presenting the person with only those test items at or near the person's ability level, thus providing the most information about the subject (Ware et al., 2005). In other words, an adaptive test essentially replicates the process by which an experienced clinician evaluates a client (Schwartz, Welch, Santiago-Kelley, Bode & Sun, 2006). For example, a clinician asks questions that are relevant to the client's approximate ability level rather than asking questions that are too easy or too difficult.

If one were testing a college math major who is doing well in his/her field, it is likely an evaluator would prefer to begin with math items close to the college level, as opposed to starting off with simple addition and subtraction problems. In a similar way, the CAT is programmed to identify the most appropriate test questions, given the test-taker's previous responses.

Despite the resulting reduction in the number of test items administered, studies have demonstrated that CATs maintain the psycho-metric properties of the original paper-and-pencil instrument. Ware, Kosinski, Bjorner, Bayliss, Batenhorst, Dahlof, Tepper & Dowson (2003) evaluated the reliability and validity of CAT-based estimates of headache impact scores in comparison with "static" surveys and found there was no compromise of the validity of the test using the CAT-based estimates. Similarly, Schwartz, et al. (2006) performed a feasibility study of a CAT-version of the Diabetes Impact Survey and found the CAT-version demonstrated good internal consistency, reliability, construct validity, and discrimination validity, and it correlated highly with the full-length survey.

Currently, CAT technology is utilized by certification boards (Lunz & Bergstrom, 1994), by professional licensing agencies, for college entrance exams (Eignor & Schaeffer, 1995), for military selection (Unpingco, Hom, & Rafacz, 1997), and various health care professions (McHorney, 1997; 1999). While this technology continues to grow in other fields, the vocational evaluation profession has yet to take advantage of these innovative methods for assessing clients with disabilities. The purpose of this article is to demonstrate the process by which a typical paper-and-pencil assessment, such as the Word Knowledge (WK) subtest of the Career Ability Placement Survey (CAPS), can be converted into a CAT format.

APPLICATION

In order to understand how assessments can be adapted to a CAT format, the following section will first describe some IRT principles and then discuss how these principles can be applied to the WK subtest of the CAPS. IRT techniques provide the foundation by which a CAT is able to determine a subject's ability level through examining an instrument's psycho-metric properties at the item level, rather than at the instrument level (Bond & Fox, 2001). Specifically, Rasch analysis is used to determine the difficulty of each test item and then is able to place the items in a hierarchy from least to most difficult. This hierarchy allows researchers to evaluate a subject's ability level in a unique way. Rather than determining a person's ability by simply summing the number of correct responses, researchers can assess a test-taker's ability level by identifying the types of items the person correctly and incorrectly answers. For example, one person may be able to answer more of the difficult items on a test than another person, but when using traditional scoring methods, each person would receive the same score because the person who correctly answered the more difficult items also missed easier items, perhaps through carelessness or because of a deficit in his or her knowledge base. Even though these two people received the same score on the test, their skill level is quite different. This concept is important because Rasch theorists argue that the summing of correct responses can misrepresent a client's ability level (Wright, 1997; Wright & Linacre, 1989). However, by examining the test items in hierarchical order, an evaluator may conclude that one individual has a higher ability because he or she did, in fact, correctly answer more challenging items. Furthermore, IRT only presents items on a test near a person's ability level. This

enables evaluators to efficiently test subjects without having the test-taker spend valuable time answering test items that are too easy or conversely, too difficult for that person.

RASCH FORMULA

The formula for the Rasch model (Linacre, 1994), is given below:

$$\log [P_n/1-P_{n-1}] = B_n - D_i$$

where

P_n = probability of person n “passing” item i ,

P_{n-1} = probability of person n “failing” item i ,

B_n = ability of person n ,

D_i = difficulty of item i .

The left side of the equation, $\log [P_n/1-P_{n-1}]$, represents the probability of a person passing a test item divided by the probability of a person failing that same test item. Additionally, the left side of the equation represents the linear transformation of raw scores into interval-based measures. Converting ordinal scores (e.g., raw scores) into interval measures is critical because the statistical analysis routinely performed on raw scores (e.g. classical test theory) improperly treats ordinal data as if it were interval data, and subsequently may confound test results.

Conversely, the right side of the equation presents two interacting components: (a) the ability of a person, (B_n); and (b) the difficulty of an item (D_i) (Linacre, 1994). The Rasch formula, $B_n - D_i$, suggests that the most important information from a person is obtained when items are matched to the difficulty level of the person (where $B_n = D_i$). Technically, a person’s ability matches item difficulty when the person has a 50% chance of passing an item and a 50% chance of failing an item. A person will have a lower probability of passing items that are above his or her ability level (i.e.,

10% chance of passing an item). And that same person will have a high probability of passing items that are below his or her ability level (i.e. 90% chance of passing an item). Therefore, items for which the person has a lower or higher probability of passing provide little information about the person’s ability. In essence, an evaluator will obtain the most information when asking questions near the test-taker’s ability level.

These IRT principles can be better understood by examining a vocational assessment such as the CAPS, a battery of tests used by evaluators to measure an individual’s vocational abilities. Because of the vocational evaluators’ familiarity with this test, these authors selected it as a logical example to demonstrate how the results of a Rasch analysis of the instrument can lead to the development of a computerized adaptive test. The CAPS includes eight, five-minute subtests, including Mechanical Reasoning, Spatial Relations, Verbal Reasoning, Numerical Ability, Language Usage, Manual Speed and Dexterity, Perceptual Speed and Accuracy, and Word Knowledge (WK). Specifically, the WK subtest consists of 56 items that measure how well an individual can understand the meaning and precise use of a word (Knapp & Knapp, 1992). Each WK item is presented with five answer choices, and clients select the answer that most closely defines the word. Once the client completes the CAPS, the evaluator uses the client’s profile to advise them on a general occupational direction (Knapp & Knapp, 1992).

Pomeranz, Byers, Moorhouse, Velozo & Spitznagel (2008) used Rasch analysis to examine the WK item hierarchy of the CAPS. Figure 1 illustrates the WK subtest person/item map for 209 graduate and undergraduate students. The left side of the figure represents each subject’s WK ability (designated with the symbols “!” and “#”). The symbols toward the bottom of

the figure represent subjects with the least WK ability, while the symbols at the top represent the subjects with the most WK ability. Conversely, the right side of the figure depicts the WK items arranged in difficulty order. Items near the top of the figure, like “lithe,” represent more challenging WK items, while items at the bottom of the figure, like “disperse,” are less challenging. A subject’s ability is measured by logits, a unit of measurement used in Rasch analysis and derived from transforming ordinal data into an interval scale (Bond & Fox, 2001). The “M” represents the means (M) of either the subjects or items.

If an evaluator asked an individual of average ability (logit=2.0, M) if he or she could correctly choose the synonym for a difficult word like “pulley,” chances are the respondent will answer incorrectly; thereby demonstrating that the item is beyond the person’s ability level. Similarly, if an evaluator asked the same individual to choose the synonym for an easy word like “gossip,” it is likely the subject would correctly respond, demonstrating the item is below the person’s ability level. Just as the lowest measurement increments of a ruler are irrelevant when measuring a person who is 6-foot tall, asking a subject if they know a synonym for “disperse” (the easiest item on the scale) may provide little information about the person’s ability level if the individual has strong vocabulary skills. Although the previous items may help generalize a person’s ability level, the clinician gains the most information when he or she targets questions near the subject’s ability level (i.e. the level at which a person has a 50 % chance of answering the item correctly).

CREATING THE CAT

IRT is the basis for creating an instrument that efficiently and precisely targets a person’s ability level, as described above. Figure 2 illustrates an algorithm that

describes how a CAT determines a subject’s ability level. First, the CAT begins with an initial item pool and assumes an initial score estimate of average ability (Step 1) and selects a corresponding item to present to the subject (Step 2). Depending upon how the subject responds to this item (Step 3), CAT re-estimates the person’s ability level (Step 4). If the person correctly answered the average item, then the CAT will select a more optimal item (i.e., a more challenging item) to present to the subject. Alternatively, if the person incorrectly answers the average item, the CAT will again select an optimal item (i.e. an easier item) to present to the subject. This cycle continues until the stopping rule is satisfied (Step 5). Stopping rules are based either on the size of a preprogrammed confidence interval or the maximum number of items that are to be used to estimate the score (Jette & Haley, 2005). If the CAT program determines that the stopping rule has not been satisfied, a new item is administered. Once the stopping rule is satisfied, the assessment is complete and the subject’s ability level has been determined. In this manner, the CAT is able to quickly target the test-taker’s ability level and administer only those test items that provide the most information about the test-taker’s ability.

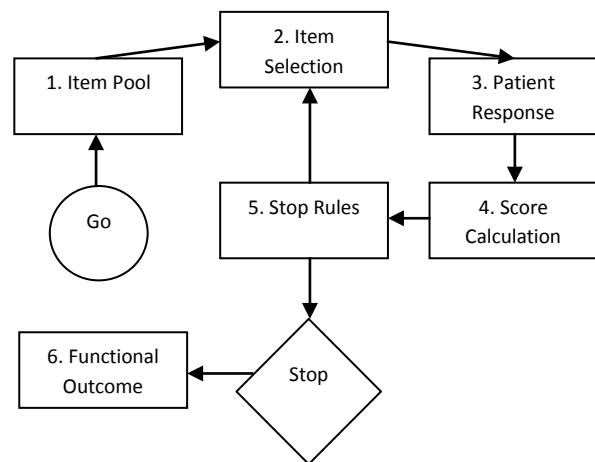


Figure 2: Illustration of basic computer adaptive test (CAT) logic (adapted with permission from the Journal of Rehabilitation Medicine).

APPLYING THESE TECHNIQUES TO THE CAPS WK SUBTEST

The items on the WK subtest are arranged in order of difficulty, as noted by their measurement score in Figure 1. In accordance with the CAT algorithm, the first item to be presented to the subject would be one of average difficulty (with a measure score of approximately zero). For the WK subtest, a likely starting item would be the word, “idolize,” “salvage,” “incessant,” or “bonus” (see Figure 1). If the subject correctly answers this average item, the response is scored and the next item presented to the person is based on this new calibration (i.e., an item at a higher difficulty level). Depending upon the subject’s response to this second item, the program would then select an item of higher difficulty or one of lower difficulty. This process is continued until the requirements of the stopping rule are met and the person immediately receives a score. A CAT does not require an evaluator to hand score the test or even to submit it for computer scoring at a later time.

APPLICABILITY OF THE CAT IN VOCATIONAL EVALUATIONS

Computer adaptive testing allows rehabilitation researchers to create measures that accurately and efficiently assess a person’s ability level in a variety of psychological constructs. As we have attempted to demonstrate with the WK subtest of the CAPS, it is possible to convert paper-and-pencil instruments used in vocational evaluation into computer adaptive tests. This innovative testing procedure has the potential to benefit the rehabilitation and vocational evaluation professions in several ways. First, rehabilitation clinicians will no longer struggle between administering a practical instrument that measures only a limited range of ability or a comprehensive

instrument that consumes valuable time (Jette & Haley, 2005). This advantage is especially practical for vocational evaluators who must balance the thoroughness of the information gathered with the amount of time it takes to obtain the information. Thus, CAT can provide rehabilitation professionals with a tool that enables them to do their work more effectively. By using a CAT, a test that previously took over an hour to administer may now be completed in less time. While it is difficult to generalize about the average amount of time saved in such situations, Chien, Wu, Wang, Castillo & Chou (2009) demonstrated that the number of items on a CAT version of an assessment could be shortened by 41.64% over the original paper-and-pencil assessment in a simulated experiment. Such a reduction has the potential to substantially reduce testing burden and thus, allow the evaluator to refocus valuable time on other assessment areas.

Aside from the reduced burden on the evaluator, CAT also minimizes consumer burden. By tailoring items to a person’s ability level, consumers respond to a limited number of questions. CAT minimizes the number of items necessary to “measure” a person’s ability. Within the field of rehabilitation, this reduction in client burden may be especially beneficial to consumers with physical and cognitive deficits. For example, a person who fatigues easily, such as an individual with a neuromuscular impairment, may find CAT’s especially useful, as CAT-modified inventories do not require taking all the questions of the inventory. In fact, subjects have described the CAT as faster, easier, and fun (Ware, et al. 2005).

In addition to alleviating testing burden on both evaluators and consumers, CAT allows clinicians to evaluate individuals with a wide variety of ability levels. In essence, a CAT item bank can be

designed to be large enough to encapsulate people with extreme ability levels, thus eliminating instrument ceiling and floor effects (Cook, O'Malley & Roddey, 2005). By having a large pool of test items to draw from, CATs allows vocational evaluation professionals to appropriately measure individuals of various ability levels. Another advantage of CAT is that the item pool for the test can be continuously updated. As items become obsolete, there is a process by which items can be discarded and new, more appropriate items added. Perhaps the biggest advantage of CAT is the instant consumer scoring. Rather than having to wait for an evaluator to score the assessments, CAT immediately determines a consumer's ability level and reports the score. This instant feedback may benefit the client by maintaining the client's motivation and interest in the testing process.

CAT CHALLENGES

There are challenges to developing a CAT-based instrument that are important to consider. Currently, having instruments converted to a CAT-format or creating new assessments with CAT may prove costly. Due to the computer-programming efforts involved in the creation of a CAT, researchers and clinicians may be subjected to paying high development fees. Another limitation to CAT is it may reduce the evaluator's ability to assess intangible client traits like attention, tolerance and concentration. Although the CAT is limited when measuring these attributes, the evaluator may be able to compensate for this reduced information by obtaining it through other non-CAT tasks, such as direct observation on work samples. Finally, some people may be uncomfortable using computers, thus making it difficult to obtain an accurate understanding of their true abilities. Despite this assertion, multiple studies (Buxton, White, & Osoba, 1998;

Sutherland, Campbell, Ornstein, Wildemuth & Loback, 2001; Hahn, Cella, Dobrez et al. 2003, 2004) suggest people have positive reactions to computer-based outcome assessments, even among those unfamiliar or uncomfortable with the technology.

CONCLUSION

Despite these noted limitations, CAT offers an efficient alternative to traditional paper-and-pencil tests with many advantages, especially concerning people with disabilities. Specifically, in the rehabilitation counseling profession, CAT technology can be applied to many vocational assessments and alleviate responder and administrator burden. Currently, there is a trend in healthcare fields to use CATs. For example, a number of research articles discuss the applicability of CAT for measuring rehabilitation outcomes (Haley, Ni, Hambleton, Slavin & Jette, 2006; Hart, Mioduski & Stratford, 2005, Velozo, Wang, Lehman & Wang, 2008; Wang, Hart, Stratford & Mioduski, 2009). Vocational evaluators can also use CAT in the testing and evaluations they perform. It will likely be advantageous for the rehabilitation counseling profession to continue to investigate the use of modern technologies, like CAT, in everyday practice.

REFERENCES

- Bond, T. G., & Fox, C. M. (2001). *Applying the Rasch model: Fundamental measurement in the human sciences*. Mahwah, NJ: Erlbaum.
- Buxton, J., White, M., & Osoba, D. (1998). Patients' experiences using a computerized program with a touch-sensitive video monitor for the assessment of health-related quality of life. *Quality of Life Research*, 7(6), 513-519.
- Byrne, B. M. (1996). *Measuring self-*

- concept across the life span: Methodological issues and selected instrumentation.* Washington, DC: American Psychological Association.
- Chien, T. W., Wu, H. M., Wang, W. C., Castillo, R. V. & Chou, W. (2009). *Reduction in patient burdens with graphical computerized adaptive testing on the ADL scale: tool development and simulation.*
- Cook, K. F., O'Malley, K. J., & Roddey, T. S. (2005). Dynamic assessment of health outcomes: Time to let the CAT out of the bag? *Health Services Research, 40*(5, Part II), 1694-1711.
- Eignor, D. R., & Schaeffer, G. A. (1995). *Comparability studies for the GRE General CAT and the NCLEX using CAT.* Paper presented at the meeting of the National Council on Measurement and Education, San Francisco, April 1995.
- Hambleton, R. K., Swaminathan, H., & Rogers, H. J. (1991). *Fundamentals of Item Response Theory.* Thousand Oaks, CA: Sage.
- Hahn, E. A., Cella, D., Dobrez, D. G., Shiimoto, G., Taylor, S. G., Galvez, A. G., Diaz, P., & Valenzuela, V. (2003). Quality of life assessment for low literacy Latinos: A new multimedia program for self-administration. *Journal of Oncology Management, 12*(5), 9-12.
- Hahn, E. A., Cella, D., Dobrez, D. G., Shiimoto, G., Marcus, E., Taylor, S. G., Vohra, M., Chang, C. G., Wright, B. D., Linacre, J. M., Weiss, B. D., Valenzuela, V., Chiang, H. L., & Webster, K. (2004). The talking touchscreen: A new approach to outcomes assessment in low literacy. *Psycho-Oncology, 13*, 86-95.
- Haley, S. M., Ni, P., Hambleton, R. K., Slavin, M. D., & Jette, A. M. (2006). Computer adaptive testing improved accuracy and precision of scores over random item selection in a physical functioning item bank. *Journal of Clinical Epidemiology, 59*, 1174-1182.
- Hart, D. L., Mioduski, J. E., & Stratford, P. W. (2005). Simulated computerized adaptive tests for measuring functional status were efficient with good discriminant validity in patients with hip, knee, or foot/ankle impairments. *Journal of Clinical Epidemiology, 58*, 629-638.
- Jette, A. M., & Haley, S. M. (2005). Contemporary measurement techniques for rehabilitation outcomes assessment. *Journal of Rehabilitation Medicine, 37*(6), 339-345.
- Knapp, L., & Knapp, R.R. (1992). *Career Ability Placement Survey (CAPS).* San Diego, CA: EDITS.
- Linacre, J. M. (1994). Sample size and item calibration stability. *Rasch Measurement Transactions, 7*, 328.
- Lunz, M.A., & Bergstrom, B.A. (1994). An empirical study of computerized adaptive test administration conditions. *Journal of Educational Measurement, 31*, 251-263.
- McHorney, C. A. (1997). Generic health measurement: Past accomplishments and a measurement paradigm for the 21st century. *Annals of Internal Medicine, 127*:8(2), 743-750.
- McHorney, C. A. (1999). Health status assessment methods for adults: Past accomplishments and future challenges. *Annual Review of Public Health, 20*:309-335.
- Pomeranz, J. L., Byers, K. L., Moorhouse, M. D, Velozo, C. A. & Spitznagel, R. J. (2008). Rasch analysis as a technique to examine the psychometric properties of a Career Ability Placement Survey subtest. *Rehabilitation Counseling Bulletin. 51*(4):251-259.
- Rasch G. (1960). *Probabilistic Models for Some Intelligence and Attainment Tests.* Chicago, IL: University of Chicago Press.

- Schwartz, C., Welch, G., Santiago-Kelley, P., Bode, R., & Sun, X. (2006). Computerized adaptive testing of diabetes impact: A feasibility study of Hispanics and non-Hispanics in an active clinic population. *Quality of Life Research, 15*(9), 1503-1518.
- Sutherland, L. A., Campbell, M., Ornstein, K., Wildemuth, B., & Lobach, B. (2001). Development of an adaptive multimedia program to collect patient health data. *American Journal of Preventative Medicine, 21*(4), 320-324.
- Unpingco, V., Hom, I., & Rafacz, B. (1997). Development of a system for nationwide implementation. In W.A. Sands, B.K. Waters, & J.R. McBride (Eds.), *Computerized adaptive testing: From inquiry to operation* (pp. 209-218). Washington, DC: American Psychological Association.
- Velozo, C. A., Wang, Y., Lehman, L., & Wang, J. H. (2008). Utilizing Rasch measurement models to develop a computer adaptive self-report of walking, climbing, and running. *Disability and Rehabilitation, 30*, 458-467.
- Vispoel, W. P. (1993). Computerized adaptive and fixed-item versions of the ITED Vocabulary subtest. *Educational and Psychological Measurement, 53*, 779-788.
- Vispoel, W. P. (2000). Computerized versus paper-and-pencil assessment of self concept: Score comparability and respondent preferences. *Measurement and Evaluation in Counseling and Development, 33*, 130-143.
- Ware, J. E., Gandek, B., Sinclair, S. J., & Bjorner, J. B. (2005). Item response theory and computerized adaptive testing: Implications for outcomes measurement in rehabilitation. *Rehabilitation Psychology, 50*(1), 71-78.
- Ware, J. E., Kosinski, M., Bjorner, J. B., Bayliss, M. S., Batenhorst, A., Dahlof, C. G., Tepper, S. & Dowson, A. (2003). Application of computerized adaptive testing (CAT) to the assessment of headache impact. *Quality of Life Research, 12*, 935-952.
- Wang, Y. C., Hart, D. L., Stratford, P. W., & Mioduski, J. E. (2009). Clinical Interpretation of Computerized Adaptive Test-Generated Outcome Measures in Patients With Knee Impairments. *Archives of Physical Medicine and Rehabilitation, 90*, 1340-1348.
- Weiss, D. J., & Kingsbury, G. G. (1984). Application of computerized adaptive testing to educational problems. *Journal of Educational Measurement, 21*(4), 361-375.
- Wright, B. D. (1997). A history of social science measurement. *Educational Measurement: Issues and Practice, 16*(4), 33-45, 52.
- Wright, B. D., & Linacre, J. M. (1989). Observations are always ordinal; Measurements, however, must be interval. *Archives of Physical Medicine and Rehabilitation, 70*, 857-860.
- Wright, B. D., & Masters, G. N. (1982). *Rating Scale Analysis*. Chicago: MESA.
- Wright, B. D., & Stone, M. H. (1979). *Best test design: Rasch measurement*. Chicago, IL: Mesa Press.

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EMPOWERMENT VOCATIONAL EVALUATION: MOVING FROM IMPLIED TO EXPLICIT

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ABSTRACT

Vocational evaluation is a systematic process of vocational assessment and career exploration that is tailored to meet the needs of the individual consumer (Institute on Rehabilitation Issues, 2003a). Vocational evaluation is one of the most efficient and effective ways to work with individuals to identify their knowledge, skills, and abilities, and strategies to overcome barriers to successful employment. Through developing knowledge about both the individual and the world of work, evaluators become effective advocates for these individuals. Advocacy and information sharing are part of empowering consumers to make informed choices about the course of services. This paper traces the evolution of empowerment in vocational evaluation from an implied concept to an explicit part of the process for consumers.

INTRODUCTION

Empowerment is often described in academic journals (e.g., *Journal of Rehabilitation*, *Rehabilitation Counseling Bulletin*, *Families in Society*, and *Vocational Evaluation and Work Adjustment Bulletin*) as an important part of a consumer's journey through services. There are numerous definitions of empowerment, but these have not been clearly operationalized, which causes problems for both professionals and consumers. The consumer who is supposed to become empowered may come away from services not understanding the process. This article traces the evolution of empowerment from an implied concept to an explicit part of the vocational evaluation process. Specifically, the paper looks at definitions of empowerment, the events and laws that shaped the development of consumer empowerment in vocational evaluation, and current practices that can inform the continued development of consumer

empowerment during vocational evaluation services.

DEFINITIONS OF EMPOWERMENT

There is no universally accepted definition of empowerment. However, definitional flexibility is important because empowerment needs to be tailored to the needs of individuals who are empowering others and those who are becoming empowered. Thus, empowerment of persons with disabilities and other consumers of vocational services has evolved from individual consumer perspectives and professional fields including psychology, social work, rehabilitation counseling, and vocational evaluation. These disciplines have different intellectual and philosophical foundations that inform the definition of empowerment.

Traditionally, practitioners and scholars have defined empowerment and over time, consumers have contributed to this concept. Consumer definitions are

important to the development of a true working alliance between the individual receiving services and the professional delivering the services. For example, the more a consumer understands and self-defines empowerment, the greater the consumer's involvement in the process of services. Philosophically, consumer definitions are important because empowerment is not just a process of making informed choices and developing a partnership between consumer and professional, it also involves developing the consumer's voice. An empowered consumer can articulate or demonstrate important personal needs and wants.

CONSUMER DEFINITION

One useful definition of consumer empowerment comes from United Cerebral Palsy (UCP), an advocacy and service organization for persons with disabilities (Condeluci, 1989). UCP defines empowerment through a model of service delivery and consumer participation. In their definition, persons with disabilities are able to make decisions and become empowered when they have access to the appropriate services and supports within the system. Access is the key to empowerment because persons with disabilities have traditionally been denied the right to make choices about services and have had few supports within the community. Harlan Hahn (1991), a researcher with disabilities, proposed that empowerment be examined within the minority group model. According to this model, a person with a disability is empowered when the individual identifies with others who have a disability and works to change personal and societal barriers to participation. Empowerment becomes both a frame of mind through personal identification with disability and an action through participation in the disability movement (Hahn, 1991). Other consumer-written or oriented publications, such as *This Brain*

Has a Mouth (People with Brains, 1991), argue that the "system" of services that keep people with disabilities dependent or disempowered is designed by everyone in society, as voters, workers/professionals, and family members who do not strive for the most open and barrier-free communities. Therefore, all people, including persons with disabilities, are responsible for developing a system of services that is empowering to the individual.

SOCIAL WORK DEFINITION

Social work professionals have recognized empowerment as a concept not traditionally guided by consumers. For example, Boehm and Staples (2004), who conducted a content analysis of twelve focus groups with consumers (groups of elderly persons, single parents, teens, and community activists) and social workers, found striking differences in the way that empowerment of the individual within services was viewed. Consumers identified four important themes: mastery, self-determination, collective belonging, and involvement and control of organizations in the community. Social workers recognized the concepts of mastery and self-determination of consumers, but they did not see collective belonging or involvement and control of advocacy organizations as important. The professionals discounted the connection between people with similar experiences and the possible mentoring that can occur from such a connection. Even though the focus groups were not made up of persons with disabilities, this study is important because consumers of various services were asked to define the components of empowerment (Boehm & Staples, 2004).

Social work theorists examine empowerment from a systems framework in which people with and without power act upon each other. The interaction changes

both parties within the relationship. The systems framework is important because individuals do not exist in isolation, but rather in an environment of others, including families and social networks that influence the life course. Part of life for persons with disabilities and other minorities is often the service system. The word empowerment can be deconstructed to the core concept of “power,” or the individual’s perception that he or she has control of the forces that drive the individual’s life or are of benefit to the individual or family system (Pinderhughes, 1983). Minorities and persons with disabilities have consistently had to contend with racism, ablism, sexism, and other forms of oppression, such as poverty. Oppressed persons feel and are perceived to be powerless, or unable to wield control over life or change negative situations and attitudes (Hahn, 1988). Lack of power is painful to the individual and causes psychic dysfunction for both the individual and family members. Within social work, empowerment becomes both the individual treatment goal and part of a larger movement for social justice. Empowerment within this framework is conceptualized as persons’ “ability and capacity to cope constructively with the forces that undermine and hinder coping, the achievement of some reasonable control over their destiny” (Pinderhughes, 1983, p.334).

PSYCHOLOGY AND MENTAL HEALTH COUNSELING DEFINITION

Definitions of empowerment by other professions are also important because service providers need a philosophic context for their work. Psychologists and mental health counselors examine the various social roles of individuals that lead to personal empowerment. Community psychologists emphasize the “the process by which people gain some control over valued events, outcomes, and resources” (Balcazar,

Mathews, Francisco, Fawcett, & Seekins, 1994, p.471). Personal power, social relationships, and a sense of control are important dimensions of the process of individual empowerment. Counselors define empowerment as a process by which individuals or groups become aware of power dynamics, develop the skills necessary to control their life course, and exercise this control without infringing on the rights of other people (McWhirter, 1994). Empowered individuals or groups can support the development of empowerment in others through ongoing positive relationships, role modeling, and community involvement. True empowerment rests on the idea that others are continually being brought into the circle of power. Counseling professionals can support this empowerment by involving individual consumers or groups in their own treatment plans and services from the beginning (30th IRI, 2003a).

REHABILITATION DEFINITION

In rehabilitation literature, the idea of empowerment has always been central to the provision of appropriate consumer services. Since the 1950s, scholars and researchers furthered the development of empowerment in rehabilitation and vocation evaluation. These professionals did not use modern terms (for example, “handicapped” was the common term for persons with disabilities), but the spirit of informed choice, consumer empowerment, and self-determination was embedded in their work. Two researchers at the forefront of empowerment in the discipline of rehabilitation counseling were Patterson (1958) and Levine (1959).

Patterson (1958), in writing about the goal of rehabilitation services, discussed the need for a consumer to make choices about services while working with a rehabilitation counselor to achieve independence. This can only be achieved when the consumer takes personal responsibility for his or her life and

actions. Individual responsibility and independence must begin at the outset of the counseling process, or the consumer is not likely to develop the habit later in the course of services. Ideally, individualized services are based on the uniqueness of each consumer, sensitive to attitudes and prejudice against persons with disabilities, and recognition that vocational choice must be based on the skills, abilities, and interests of each consumer and not solely determined by disability type (Patterson, 1958).

Levine (1959) described the relationship between the consumer and the rehabilitation worker or counselor as a partnership in which the counselor assists the consumer to become self-reliant in life and work. Levine (1959) recognized work-identity is central to our culture and that the “competent rehabilitation worker,... who skillfully responds to the person’s needs for information and guidance can make a distinct contribution to the person’s efforts to clarify his self-image” (p.11).

Moving forward in time, Kosciulek and Wheaton (2003) propose a comprehensive framework of empowerment within the rehabilitation counseling process. Rehabilitation counselors and consumers first form a working alliance, and this becomes the basis for consumer self-determination and informed choice. A true working alliance occurs when the counselor and consumer collaborate to establish goals and accomplish tasks that lead to a favorable outcome (Lustig, Strauser, Rice, & Rucker, 2002). As consumers accomplish more tasks and take more responsibility for their rehabilitation process, they gain motivation from making autonomous choices about services and reflecting on this experience in other situations (Gagne & Deci, 2005). This acting and reflecting on experiences and motivations by consumers is part of the process of self-determination. An empowered consumer is one who has

information to make purposeful and informed choices. Making an informed choice is a characteristic of self-determination (30th IRI, 2003a).

Within the rehabilitation process, self-determination is the ability and capacity of consumers to make choices, define goals, and self-determine the course of their own life or fate (Field & Hoffman, 2007). In their model, self-determination becomes the primary effort of all rehabilitation professionals, including vocational evaluators. Making an informed choice is the process that rehabilitation consumers use to “make decisions about their assessment services, vocational goals, the services and the service providers that are necessary to reach those goals” (Kosciulek & Wheaton, 2003). The ultimate goal of services is empowerment of the consumer with disabilities, which is the ability to possess the same amount of control and responsibility over one’s own life and circumstances that a non-disabled person has in the society (Kosciulek & Wheaton, 2003).

Rehabilitation theorist, William Emener (1991), has developed an empowerment model that rests on the philosophical foundations of rehabilitation counseling. Namely, the individual has great worth and dignity, every person should have the opportunity to maximize his/her potential even if the person needs help from others to achieve this potential, people want to grow and change in positive ways, and ultimately, in our society, each person should have the freedom to self decide and manage the outcomes of those decisions. From these basic philosophical tenets, Emener proposes a self-empowerment approach for consumers of rehabilitation services. With this approach, empowerment is the process by which people who have been powerless develop skills to take control over their lives. In the rehabilitation process, this means ensuring active participation of

consumers in gathering information about all aspects of their rehabilitation, generating alternative courses of action for assessment and other services and weighing the consequences of those alternatives, and finally, formulating a final plan of action for services.

Empowerment, as the core paradigm of consumer driven services, was addressed in the 29th Institute on Rehabilitation Issues (IRI), *Promoting Consumer Empowerment through Professional VR Counseling* (2003b). According to this model, empowered consumers take control of the direction of their lives and services in two ways: through acquiring needed skills, supports, and services; and by exhibiting confidence while forming employment goals with the rehabilitation team. Empowered consumers make informed choices and are motivated to complete their own vocational and personal goals. The role of the practitioner is to facilitate this process by helping the consumer to ask and answer

questions (IRI, 2003b) similar to those presented in Figure 1.

VOCATIONAL EVALUATION DEFINITION

All of these definitions have informed the practice of vocational evaluation. The 30th IRI (2003a) discusses the purpose and process of vocational evaluation. It determines the potential of an individual with a disability to be successful in a particular occupation(s) or career, helps identify strategies for success and informs the planning process. The vocational evaluator systematically gathers and synthesizes information about the consumer and the current world of work, then provides this information and supports the rehabilitation team (which includes the consumer) in developing vocational goals. Support for the consumer's goal development by the evaluator is part of the empowerment process, which enables the consumer to make the most informed choice about his or her career path (29th IRI, 2003b).

What type of support will help me succeed in VE?

How will VE help me find out what type of work environment am I most suited for?

How can VE help me to recognize strengths, skills and talent?

What am I willing to do to develop my VE plan?

How will the VE results help me to know where I want to be a year from now?

How will VE help me to recognize my accomplishments?

How will VE help me recognize my concerns and issues I have about working?

What are things I need to think about before starting VE and eventually taking a job?

What information from my VE should be shared with an employer or service provider, and what shouldn't?

Figure 1. Facilitating empowerment based on modified questions from the 29th IRI (2003b, pp. 6-7)

Consumer empowerment is the basis for all other philosophical and functional paradigms in the practice of vocational evaluation. The 30th IRI (2003a) noted that the empowerment paradigm is the foundation for three key paradigms: cultural sensitivity, universal design and assistive technology, and individualization of services. All of these rest on the idea that the consumer can make an informed choice about services when given appropriate information in an accessible format. The 21st IRI (1995), defined informed choice as “a process in which consumers share mutual responsibility with counselors in identifying options and considering the advantage and disadvantage of each from the consumer’s viewpoint” (p.1). True informed choice follows when the consumer and professional have equal status within their working relationship and each is working on consumer generated goals (IRI, 1995).

HISTORY OF EMPOWERMENT IN VOCATIONAL EVALUATION

Empowerment of the consumer to become increasingly self-aware, make informed choices, and determine the course of services is not an entirely new construct in vocational evaluation. The term “empowerment” emerged in the 1970s and 1980s with the development of the consumer movement and the increased specialization of evaluation and assessment services (Institute on Rehabilitation Issues, 2003b). However, while the terms may be new, examination of the history of vocational evaluation shows that concepts of empowerment have been written about and discussed in the field since its beginnings. Seminal works by Pruitt (1986), Nadolsky (1971) and Neff (1970) all have underpinnings in an empowerment philosophy.

Vocational evaluation emerged from vocational rehabilitation in the 1950s, as a

result of consumers’ and referral sources’ need for realistic and individualized assessments that mirrored working conditions. Legislation and research documented the need for vocational evaluation services and provided the impetus for agencies to start developing evaluation practices. After wounded veterans returned from World War II, several laws expanded vocational counseling and evaluation services. For example, both the Davis-Bacon Act and the Vocational Rehabilitation Act Amendments of 1954 mandated funding and training for the development of separate vocational assessment and counseling services, and these developed into the vocational evaluation services we know today (IRI, 2003a).

As rehabilitation counselors, evaluators, and scholars were improving services for persons with disabilities, the laws also began to change the way that consumers and professionals interacted with the service system. The Rehabilitation Act of 1973 and the Education of All Handicapped Children Act of 1975 required written plans that consumers signed. Additionally, eligibility was determined by an assessment process (Patterson, Bruyere, Szymanski, & Jenkins, 2005). Theoretically, these laws empowered consumers to become active partners in their own services since they participated in the planning and assessment process.

Within the discipline of vocational evaluation, several authors began writing about the need for consumer motivation and responsibility (Nadolsky, 1971; Neff, 1970; Pruitt, 1986; VEWAA, 1975) and participation in decision making over the course of services. Additionally, the authors of *The Vocational Evaluation Project Final Report* (VEWAA, 1975) argued that a “prime purpose of evaluation is to create an atmosphere of respect and interest for the client so that he can make personal

evaluations and adjustments, proceed in training, and be employed” (p.101). Evaluators and other rehabilitation professionals were recognizing that services would be more effective if the consumer was part of the team. The consumer was encouraged to bring needs and perspectives to the table. The purpose of the evaluation shifted from type of evaluation to ways the evaluator could help the consumer make decisions about personal and vocational goals (VEWAA, 1975). Thus writers in the rehabilitation field were starting to define consumer empowerment in a working alliance, and to agree that the consumer has the right to make an informed choice.

EMPOWERMENT PRACTICES

For working evaluators, empowerment needs to be taken from a philosophical concept to an actual practice usable in the day-to-day work setting. The empowerment process actually begins before the evaluator meets with the consumer for the first time. Evaluator awareness of consumer empowerment is critical for the first file review or the first telephone conversation with the consumer. In a survey of 40 rehabilitation studies students, Thoma and Sax (2003) found the majority believed that self-determination and related concepts like empowerment of consumers were important and thought these concepts should be operationalized in the service setting. The survey did not ask how empowerment would become operationalized.

Several strategies for consumer empowerment can be used during the initial interview. One strategy is motivational interviewing, which is defined as “a client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence” (Miller & Rollnick, 2002). The professional uses motivational interviewing techniques to address ambivalence and resistance to

change directly by eliciting and reinforcing natural change talk coming from the consumer (Miller & Rollnick, 2002). Motivational interviewing uses the intrinsic desire of the consumer to change within the service process. Power (2006) suggests the use of motivational interviewing techniques to shift the focus from negative loss experiences to positive reviews of consumer career-related assets during the initial interview process. The following questions may guide the evaluator when explaining services:

What goals did the consumer express for the evaluation? What vocational assessment approach is most in harmony with the consumer’s cultural, educational, and work experience? Does the consumer have distinctive needs that would be best met with one specific assessment approach than another? What approaches are available for the vocational evaluation of the consumer? (Power, 2006, p.23).

When both the professional and the consumer are aware of their responsibilities within the service relationship, a true partnership can develop. The consumer needs to take the lead by conducting a review of personal skills, abilities, and strengths, while also identifying what is needed or desired as an outcome from the assessment process. Power (2006) provides a series of questions to ask the consumer about assessment to facilitate participation in the evaluation process: “What approach do you believe is best for you? What approach that I have explained do you believe would meet your expectations? What approach would you believe works best for you?” (p.23). If a consumer has difficulty giving feedback, friends and family may be called in to support the individual through the process. Appropriate questions can lead the consumer to make an informed choice because the individual has the “motivation to seek, when necessary,

further information about a particular assessment approach” (Power, 2006, p.23).

Other rehabilitation practitioners have also written about ways to operationalize the empowerment process. Beck (1994) suggests the use of a technique called “examination of consumer courage” within the interview process (p.6). In this examination, consumers are asked to review situations in their own lives or jobs where they have performed successfully. Then consumers brainstorm ways that they can use this success within the current situation. This review helps a person to overcome fears or blocks to being successful in vocational planning and assessment. Additionally, peer support from persons with disabilities who are working or have successfully completed rehabilitation provides mentoring and role modeling to consumers (Beck, 1994). In other words, examination of another person’s courage is helpful as well.

The 30th Institute on Rehabilitation Issues (2003a) suggests the use of assistive technology throughout the vocational evaluation process can also empower the consumer. Appropriately used, assistive technology can shift the evaluation away from mere performance assessment to a problem-solving collaboration between the evaluator and the consumer. Assistive technology may help consumers to complete tasks that may have been impossible before, and the vocational evaluator can work with the consumer to identify transferable skills. From this, the consumer can become more confident and able to make decisions, and may become more hopeful about the course of services. Additionally, assistive technology can help the consumer realize independence in ways different from the past.

Another empowerment practice is the use of consumer portfolios. There are several models that describe the use of portfolios with consumers. The 30th IRI

(2003a) describes portfolios used within vocational evaluation as both a product and a process. The product is a communication tool that presents “a purposeful, organized collection of artifacts/evidence used to demonstrate an individual’s competence, knowledge, or skills in a given area” (Institute on Rehabilitation Issues, 2003a, p. 168). As a process, the portfolio is a tool consumers use to reflect on aspects of their own motivations, career goals, skills, abilities, and talents. The portfolio is useful in empowering a consumer to make decisions about not only what to include in a portfolio, but how to use this document in the planning process (30th IRI, 2003a). Portfolios may be produced electronically as well as in more traditional formats. Digital portfolios are important because of the portability and the ability to use audio and video clips to present a three dimensional picture of the consumer (30th IRI, 2003a).

Condon and Callahan (2008) describe the Individualized Career Planning Model, which promotes self-determination and informed choice on the part of students with severe disabilities when transitioning from school to work. Their consumer portfolio has three components: discovery, vocational profile, and a representational profile. Discovery includes personal information and answers the question: who is this student? Evaluators gather interests and strengths in a series of interviews, activities, and observations with anyone who knows the consumer well (Condon & Callahan, 2008). The vocational profile is a written description that guides the creation of school and community based jobs, begins to customize employment for the student with input from all team members (VR counselor, evaluator, school personnel and family members), and examines ideal conditions for work (accommodations and contributions or skills the job seeker has). In addition, the vocational profile identifies individual

preferences, specific job tasks the consumer will have to perform, and a list of potential employers. The representational profile is a paper or electronic presentation which introduces customized employment and the job seeker to a potential employer.

Portfolios can also be used with adults with severe disabilities (Tschopp, Perkins, Hart-Katuin, Born, & Holt, 2007). Portfolios provide awareness of job readiness and effective strategies for employment. Tschopp et al. (2007) used focus groups with rehabilitation providers for consumers who were mentally ill and had criminal records to find effective ways to disclose criminal and psychiatric histories as well as consumer successes. One such technique was the use of a portfolio. Consumers were able to build self-esteem and confidence by highlighting strengths and skills and finding positive outcomes even from prison records (Tschopp et al., 2007).

Evaluator-facilitated empowerment of the consumer does not conclude with the end of the formal assessment. Follow up with the consumer after the end of services is needed to ensure that the consumer's needs and desires were met during the service process (Thomas, 1997). Finding what worked and what did not work from the consumer's viewpoint can lead to better services for this person and others in the future. Hopefully, consumers will feel empowered to take an active role in the rehabilitation services process in the future as needed.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

This review provides several insights about the conceptual and pragmatic evolution of empowerment in vocational evaluation. Development of an inclusive

definition has not occurred. Our review of the definitions yielded one common theme across all disciplines: empowerment leads to an informed choice. Empowerment in vocational evaluation is most closely aligned with and influenced by rehabilitation with influencing themes of consumer responsibility, alliance with the consumer, and consumer reflection on choice. The latter has differing contexts. Within rehabilitation literature one aspect of reflection is related to service selection and within vocational evaluation it is presented within the context of process with portfolio assessment as an example. Other disciplines have contributed to the dialog on empowerment but their themes (i.e., professional control, community involvement, sense of belonging, and marginalization) are not explicitly present in the vocational evaluation discourse (see Table 1). Vocational evaluation has clearly embraced empowerment as a foundational paradigm for the profession as articulated in the 30th IRI (2003a).

Empowerment has been a part of vocational evaluation since the beginning of the profession. When vocational evaluation emerged in the 1950s, it was developed in response to the needs of consumers and professionals. The development of individualized services allowed professionals to begin reconceptualizing the process of assessments and the role consumers could take. As rehabilitation practitioners began to consider services in the context of a working relationship between the consumer and the professional, vocational evaluation developed to address consumers' needs to determine the course of services. Thus, the vocational evaluation process became an efficient and effective way for consumers to develop and collect vocational and career information.

Table 1

Summary of Empowerment Themes across Disciplines

Element	Disciplines				
	Consumer	Social Work	Psychology	Rehabilitation	Vocational Evaluation
Professional control		x			
Empowerment leads to informed choice	x	x	x	x	x
Consumer community involvement and sense of belonging	x		x		
Consumer marginalized		x		x	
Consumer responsibility				x	x
Working alliance				x	x
Consumer reflection on choice				x	x

The evaluation process encourages consumers to make informed choices about rehabilitation plans and job searches. Additionally, as the holder of information about both the consumer and the world of work, the vocational evaluator can become a strong advocate for the consumer within the rehabilitation team. The empowered consumer has greater self-awareness, specific vocational and/or life goals, responsibility, and motivation. These result in the consumer having confidence about his/her ability to make an informed choice about services. Thus, informed choice is a direct outcome of consumer empowerment. Even though rehabilitation professionals may know that empowerment is an important concept, the term, “consumer empowerment” is both

difficult to define and operationalize. The reasons for this are many; empowerment has individual as well as discipline related meanings and it functions as a way to structure belief, not as a clear, concrete rule or mandate. Operationalization of empowerment rests on awareness and the use of practices that demonstrate respect for consumer needs and desires and a partnership between the consumer and professional. The partnership must begin prior to the first meeting with the consumer and continue through follow-up with the consumer after the evaluation process is completed.

Future research needs to address empowerment issues from both quantitative and qualitative perspectives. Quantitative indicators of consumer empowerment need

to be developed to provide answers to questions like: What are the most effective ways to facilitate consumer empowerment within the service setting? Are current empowerment practices truly effective in promoting consumer empowerment? Additionally, what are the specific empowerment outcomes for consumers and evaluators? Qualitative research needs to be conducted with consumers to determine what consumers understand about the empowerment process within rehabilitation services and vocational evaluation. Phenomenological studies of the meaning of empowerment to rehabilitation professionals and consumers would broaden our understanding of the concept. Studies are also needed of professional empowerment for evaluators and the ways in which empowerment practice by evaluators with consumers is self-empowering. In other words, the very aspects of evaluation that are useful in the development of consumer empowerment may also empower evaluators to seek higher levels of competence and professional development.

REFERENCES

- Balcazar, F. E., Mathews, R. M., Francisco, V. T., Fawcett, S. B., & Seekins, T. (1994). The empowerment process in four advocacy organizations of people with disabilities. *Rehabilitation Psychology, 39*(3), 189-203.
- Beck, R. J. (1994). Encouragement as a vehicle to empowerment in counseling: An existential perspective. *Journal of Rehabilitation, 60*, 6-11.
- Boehm, A., & Stapels, L. H. (2004). Empowerment: The point of view of consumers. *Families in Society, 85*(2), 270-280.
- Condeluci, A. (1989). Empowering people with cerebral palsy. *Journal of Rehabilitation, 55*(2), 15-16.
- Condon, E., & Callahan, M. (2008). Individualized career planning for students with significant support needs utilizing the discovery and vocational profile process, cross-agency collaborative funding and social security work incentives. *Journal of Vocational Rehabilitation, 28*, 85-96.
- Emener, W. G. (1991). Empowerment in rehabilitation: An empowerment philosophy for rehabilitation in the 20th century. *Journal of Rehabilitation, 57*(4), 7-12.
- Field, S., & Hoffman, A. (2007). Self-determination in secondary transition assessment. *Assessment for Effective Intervention, 32*(3), 181-190.
- Gagne, M., & Deci, E.L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior, 26*, 331-362.
- Hahn, H. (1988). The politics of physical differences: Disability and discrimination. *Journal of Social Issues, 44*(1), 39-47.
- Hahn, H. (1991). Alternative views of empowerment: Social services and civil rights. *Journal of Rehabilitation, 57*(4), 17-19.
- Institute on Rehabilitation Issues. (1995). In R. R. Fry (Ed.), *Operationalizing consumer decision making and choice in the VR process* (21st Institute on Rehabilitation Issues Monograph ed.). Menomonee, WI: University of Wisconsin-Stout.
- Institute on Rehabilitation Issues. (2003a). *A new paradigm for vocational evaluation* (30th Institute on Rehabilitation Issues ed.). Washington, D.C.: Rehabilitation Services Administration, U.S. Department of Education.
- Institute on Rehabilitation Issues. (2003b). *Promoting consumer empowerment through professional VR counseling* (29th Institute on Rehabilitation Issues ed.). Washington, D.C.: Rehabilitation Services Administration, U.S. Department of Education.

- Monograph ed.). Washington D.C.: Rehabilitation Services Administration, U.S. Department of Education.
- Kosciulek, J. F., & Wheaton, J. E. (2003). Rehabilitation counseling with individuals with disabilities: An empowerment framework. *Rehabilitation Education, 17*(4), 207-214.
- Levine, L. (1959). The impact of disability. *Journal of Rehabilitation, 25*(6), 10-12.
- Lustig, D. C., Strauser, D. R., Rice, N. D., & Rucker, T. F. (2002). The relationship between working alliance and rehabilitation outcomes. *Rehabilitation Counseling Bulletin, 46*(1), 25-33.
- McWhirter, E. H. (1994). *Counseling for empowerment*. Alexandria, VA: American Counseling Association.
- Miller, W.R., & Rollnick, S. (2002). *Motivational interviewing: preparing people for change* (2nd ed.). New York: Guilford Press.
- Nadolsky, J. M. (1971). *Development of a model for vocational evaluation of the disadvantaged. interim report*. Auburn, AL: Department of Vocational and Adult Education, Auburn University.
- Neff, W. S. (1970). Vocational Assessment-theory and model. *Journal of Rehabilitation, 36*(1), 27-29.
- Patterson, C. H. (1958). The counselor's responsibility in rehabilitation. *Journal of Rehabilitation, 24*(1), 7-8.
- Patterson, J.B., Bruyere, S., Szymanski, E.M., & Jenkins, W. (2005). Philosophical, historical, and legislative aspects of the rehabilitation counseling profession. In R.M. Parker, E.M. Szymanski, & J.B. Patterson (Eds.) *Rehabilitation Counseling: Basics and beyond* (4th ed.) (pp. 27-53). Austin, TX: Pro-ed.
- People with Brains. (1991, May/June). *This brain has a mouth: Special professional issue, 7*. (Available from Mouth, PO Box 558, Topeka, KS 66101-0558, or <http://www.mouthmag.com/>).
- Pinderhughes, E. B. (1983). Empowerment for our clients and for ourselves. *Social Casework: The Journal of Contemporary Social Work, 64*(6), 331-338.
- Power, P. W. (2006). Operationalizing the concept of empowerment during the vocational assessment process. *Journal of Applied Rehabilitation Counseling, 37*(2), 21-25.
- Pruitt, W. A. (1986). *Vocational evaluation* (2nd ed.). Menomonie, WI: Walt Pruitt Associates.
- Thoma, C. A., & Sax, C. A. (2003). Self-determination: What do rehabilitation counseling students know and where do they know it? *Journal of Vocational Rehabilitation, 19*, 89-94.
- Thomas, S. (1997). *Vocational evaluation and assessment: Philosophy and practice*. Greenville, NC: Unpublished Manuscript.
- Tschopp, M. K., Perkins, D. V., Hart-Katuin, C., Born, D. L., & Holt, S. L. (2007). Employment barriers and strategies for individuals with psychiatric disabilities and criminal histories. *Journal of Vocational Rehabilitation, 26*(3), 175-187.
- Vocational Evaluation and Work Adjustment Association. (1975). Vocational evaluation project final report, reprint no.12. *Vocational Evaluation and Work Adjustment Bulletin, 8* (Special Edition).

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ASSESSMENT OF EXECUTIVE FUNCTION IN REHABILITATION

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ABSTRACT

Executive function is a complex but important concept for rehabilitation clients and professionals. Executive function includes skills such as setting goals, initiating, organizing, and planning. These skills are particularly important when working with individuals with disabilities because deficits may be more often present among certain groups of people. Individuals with attention deficit hyperactivity disorder, brain injury, schizophrenia, substance use problems, and even chronic illness have been shown to have problems with executive function. A review of assessment tools used to measure executive function will remind the reader how executive function skills can be evaluated. With more attention to the assessment of executive function, interventions can be tailored to meet the needs of individuals with problems in the area of executive function.

INTRODUCTION

It has become increasingly important for rehabilitation professionals to make decisions regarding an individual's functional skills. These skills may include the ability to work, manage money, or live independently (Mackin, Horner, Harvey, & Stevens, 2005). To accurately assess these basic functional skills, rehabilitation professionals have typically used assessment instruments measuring domains such as intelligence, language ability, and stored knowledge (Ylvisaker & Feeney, 2002). Despite the importance of these inter-related constructs, executive function is a potential area of cognitive deficit for individuals with disabilities often overlooked during the assessment process. Executive function deficits may go unnoticed, and greater impairment than predicted by the assessment process may be present (Egger, De May, &

Janssen, 2007; Ylvisaker & Feeney, 2002). In order to provide individuals with disabilities optimal services, increased attention should be paid to the assessment of executive function. Impaired executive functioning will significantly influence treatment interventions. This article provides a general description of executive function, a discussion of the importance of assessing executive function in various rehabilitation populations, a review of assessment instruments designed to evaluate executive function, and suggestions for clinical implications and future research in this area.

DESCRIPTIVE INFORMATION

The term executive function describes a heterogeneous set of cognitive abilities located in the prefrontal cortex (Miller & Cohen, 2001; Ylvisaker & Feeney, 2002). It is a comprehensive

description of various cognitive tasks, and several aspects of human behavior, including memory and attention, are often defined as parts of executive function. These behaviors include: setting and managing goals, planning, organizing, initiating, inhibiting, self-monitoring and evaluating, solving problems, managing attention and memory, interacting with others, learning from consequences, and possessing self-awareness (Levin & Hanten, 2005; Ylvisaker & Feeney, 2002). Problems with these various behaviors may manifest as poorly regulated attention, socially inappropriate behavior, and/or disorganized behavior. Individuals with disabilities who exhibit these behaviors may be evaluated by rehabilitation professionals as somewhat resistant, indolent, and/or lacking appropriate motivation. This has the potential to result in frustration on the part of both the client and the rehabilitation professional with the client being labeled as “non-compliant”. However, growing evidence suggests that behaviors such as these may be associated with deficits in executive function (Manchester, Priestly, & Jackson, 2004). This is the reason that rehabilitation professionals need to assess or consider executive functioning within the rehabilitation process.

Executive function tasks are novel by nature and require special effort by the individual (Ylvisaker & Feeney, 2002). In other words, when tasks become routine and habitual, fewer demands are made on the system of executive function, while new or novel tasks require significant use of executive function. Working memory is an important part of these complex tasks, which involves retrieving and manipulating information from short to long-term memory storage (Greenbaum & Markel, 2001). Areas of the prefrontal cortex are activated during tasks requiring deliberate effort of semantic analysis, categorizing, or encoding, but they

are not activated during implicit tasks in which there is little effort needed to encode or retrieve information (Ylvisaker & Feeney, 2002). Individuals whose frontal lobes have been compromised through injury or disease often exhibit deficits in executive function, thereby impacting tasks that are not only novel but also effortful and complex in nature.

IMPLICATIONS OF EXECUTIVE FUNCTION IN REHABILITATION

A systematic review of the literature was conducted to determine the importance of the assessment of executive function among disability populations. Articles published between 1999 and 2009 were included in this review with attention to traumatic brain injury (TBI), stroke, attention deficit hyperactivity disorder (ADHD), schizophrenia, substance use, and chronic illness. The following databases were utilized in the search: Academic Search, PsycINFO, PsycARTICLES, Medline, PubMed, and ERIC. Although a review of the need for assessment of executive function among additional disabilities is warranted, it was beyond the scope of the current project, and the disabilities included in this article serve as clear examples of conditions that impact memory, attention, and/or the synthesis and translation of receptive information. The following section will review evidence pointing to the need for increased attention to the assessment of executive function among the populations previously identified.

TRAUMATIC BRAIN INJURY

One of the predominant groups of individuals with disabilities identified with deficits in executive function is individuals with traumatic brain injury (TBI) (Manchester, Priestley, & Jackson, 2004). Research continues to indicate that individuals with TBI often exhibit long-term

changes in cognition and behavior associated with executive function deficits (Anson & Ponsford, 2006; Draper & Ponsford, 2008). These deficits may manifest in problems associated with occupational functioning, social integration, and emotional regulation (Anson & Ponsford, 2006; Struchen, Roebuck, Pappadis, & Ferguson, 2008). Research also indicates individuals with lower rates of performance on executive function measures are more likely to use maladaptive coping strategies (Krpan, Levine, Stuss, & Dawson, 2007). Higher rates of substance use, depression, and anxiety have been reported in this population; these conditions are also linked to deficits in executive function (Anson & Ponsford, 2006). Green et al. (2008) report that neuropsychological performance, which includes executive function, is significantly correlated with return to productivity one year post-injury, indicating that increased deficits in executive function may hinder return to productivity. Longitudinal evidence suggests the severity of TBI may be used to determine the level of executive function impairment. At a ten year follow-up, individuals with more severe TBI had lower scores on measures of executive function than did individuals with less severe TBI (Draper & Ponsford, 2008).

ACUTE STROKE

Executive function deficits are also frequently observed in individuals following acute strokes (Teasdale & Engberg, 2005). Individuals with no executive functioning impairment immediately following onset of the stroke were found to have executive function deficits three months later (Zinn, Bosworth, Hoenig, & Swartzwelder, 2007). Therefore, it may be necessary to assess executive function performance before and during the rehabilitation process. Deficits in planning, self-monitoring, and self-regulation are significantly correlated with

post-stroke productivity as measured by employment status and psychosocial reintegration (Ownsworth & Shum, 2008). Deficits in executive function have also been associated with lower levels of activities of daily living, social participation, and medication compliance (Zinn et al., 2007).

ATTENTION DEFICIT HYPERACTIVITY DISORDER

A review of the literature provides significant evidence that attention deficit hyperactivity disorder (ADHD) and deficits in executive function are closely linked. Individuals with ADHD may be unable to meet social, educational, and occupational expectations of behavior closely related to executive function, which can lead to lower self-esteem and problems in social, school, and vocational environments. These problems may later manifest as poorly regulated attention, socially inappropriate behavior, and disorganized behavior, which are all observable symptoms of ADHD (Stavro, Ettenhofer, & Nigg, 2007; Wasserstein, 2005; Ylvisaker & DeBonis, 2000). Willcutt, Doyle, Nigg, Farone, and Pennington (2005) conducted a meta-analysis of symptoms of ADHD that yielded a moderately large effect size for the presence of executive dysfunction. In addition, Nadeau (2005) examined the relationship of symptoms of ADHD, which are also examples of deficits in executive function, on workplace performance. Difficulties with time management skills, organization, prioritizing, and the ability to work independently were evident. Interpersonal problems can also occur when nonverbal cues are missed, conversations may be interrupted, and emotional overreactions may occur (Nadeau, 2005).

SCHIZOPHRENIA

An association between executive function and schizophrenia has been

supported in the literature. Cognitive measures, including executive function, have been found to account for 20% to 60% of the variance in outcomes related to social functioning (Aycicegi, Dinn, Harris, & Erkmen, 2003; Martinez-Aran et al., 2002; Reeder, Newton, Frangou, & Wykes, 2004). The ability to plan, think flexibly, and self-monitor are skills which are often impaired in individuals with schizophrenia and significantly impact social functioning. Reeder et al. (2004) found that cognitive retraining could increase executive function skills leading to improved functional outcomes. In a separate investigation, Bell, Bryson, and Wexler (2003) found that memory training techniques led to improved executive function skills among severely impaired individuals with schizophrenia, and these skills could be sustained for at least six months to allow for additional therapies to increase social and occupational functioning.

SUBSTANCE USE DISORDERS

Similar to previously discussed mental health problems, alcoholism can contribute to deficits in executive function. Long-term abuse of alcohol can affect executive function for indefinite periods of time (Uekermann, Daum, Schlebusch, Wiebel, & Trenckmann, 2003). When comparing individuals with alcoholism, depression, or healthy controls, results indicate impairments in executive function are most significant among individuals with alcoholism (Uekermann et al., 2003). These findings suggest that individuals with problems related to alcohol use may be at increased risk for executive function deficits. An additional study by Morgenstern and Bates (1999) examined the impact of alcohol use and related executive function impairment on treatment outcomes. More than half of 118 individuals in treatment for alcohol related problems showed deficits in executive function. A lower level of

executive function performance has also been found among individuals newly abstinent from alcohol. As a result, the level of executive function should be accounted for when developing rehabilitation plans (Zinn et al., 2004).

Use of opiates, cocaine, and/or methamphetamines has also been linked to problems with executive function (Gruber, Silveri, Yugelun-Todd, 2007; Washton & Zweben, 2009). Mackin, Horner, Harvey, and Stevens (2005) examined the relationship between standard neuropsychological tests and employment problems among people with substance use disorders. Individuals whose performance on a comprehensive neuropsychological evaluation showed deficits in executive function were more likely to report employment problems.

CHRONIC ILLNESS

Problems in executive function may also be associated with chronic illness (Schillerstrom, Horton, & Royall, 2005). Although this association has not been systematically studied, individuals with conditions such as hypertension, diabetes, and chronic obstructive pulmonary diseases performed significantly worse on measures of executive function. These executive function deficits may lead to increased resistance to care, decreased ability to comply with medication regimen, and decreased performance of activities of daily living. Schillerstrom et al. (2005) also suggests that too often these problems are reported as a result of memory loss, and, therefore, a specific assessment of executive function performance may be absent. Studies also indicate that individuals with relapsing-remitting multiple sclerosis have been found to have decreased skills in executive function, especially task shifting which has a significant impact on activities

of daily living (Stablum, Meligrana, Sgaramella, Bortolon, & Toso, 2004).

Increased attention to and assessment of executive function in the previously mentioned disability populations is necessary and warranted. As indicated by the research reviewed, rehabilitation outcomes for individuals with TBI, post-stroke, ADHD, schizophrenia, substance use problems, and chronic illness may be greatly improved through adequate assessment of executive function, along with related treatment interventions. It is possible that executive function deficits could improve and eventually reverse with early identification. The following section will provide a description of a variety of instruments that can be utilized in the effective assessment of executive function for these specific disability populations.

ASSESSMENT OF EXECUTIVE FUNCTION

As stated above, executive function is complex and involves different abilities and skills. To assess executive function adequately, it is almost always necessary to employ multiple tests or use test batteries (Lezak, Howieson, & Loring, 2004; Spreen & Strauss, 1998) integrated with interviews and other data. Information on specific executive function constructs and frequently used tests is provided below. Technical information, such as psychometric properties of included scales, has been omitted from this review, and the reader is encouraged to become familiar with this information as needed.

SELF-AWARENESS

Campodonico and McGlynn (1995) indicate that self-awareness is a factor that may need to be understood before appropriate intervention planning can occur. Impaired awareness can be mistaken for memory problems, when it may be the result of deficits in executive function.

Campodonico and McGlynn recommend a systematic approach to determine whether awareness is lacking using both self-report and proxy reports. High awareness has been linked to better outcomes in daily activities such as cooking and money management (Lezak et al., 2004). One of the assessments of self-awareness of physical and/or cognitive deficits is the Awareness Interview, which provides a structured interview format with a 3-point graded scoring system (Anderson & Tranel, 1989).

ATTENTION AND MENTAL FLEXIBILITY

In addition to measuring self-awareness, assessment of executive function requires an evaluation of attention and mental flexibility. The Trail Making Test (TMT) was developed as a timed test of attention, sequencing, mental flexibility, visual search, and motor function. It was first published in 1938, became a part of the Army Individual Test Battery in 1944, and was eventually added to the Halstead Battery, a frequently utilized battery in neuropsychological assessment (Spreen & Strauss, 1998). There are two parts to the test: Trail Making A requires number sequencing, and Trail Making B requires alternating between number and letter sequencing. Subjects are required to draw a continuous line to connect 25 consecutively numbered circles on the worksheet for Trail Making A and for Trail Making B there are 25 circles which alternate between consecutive numbers and letters. The time to complete the task and number of errors are recorded.

It is helpful to note that alternate forms for TMT exist. TMT-C is an alternate version of A, and TMT-D is an alternate version of B, and both have been found equivalent to the corresponding parts. A Braille version is also available and is capable of predicting brain impairment in participants with visual impairments (Spreen

& Strauss, 1998). Despite the benefits of the TMT, some limitations have also been noted. For example, there are indications that Part B may be negatively impacted by non-native language abilities, and TMT performance tends to increase with IQ scores (Buros, 2006). With all these points in mind, TMT is an effective measure of attention and mental flexibility when assessing executive function.

SELF-REGULATION

A useful measure of self-regulation is the Stroop Color and Word Test which was first published in 1935 (Spreen & Strauss, 1998). This test measures the ability to shift from one perceptual set to another in order to conform to changing demands and suppress a habitual response in favor of an unusual response. More specifically, performance across three tasks, which include reading, color naming, and color word naming, is measured. The basic Stroop Test has two trials; one trial requires an individual to focus on reading color words printed in ink of different colors, and the other trial requires an individual to name the color of ink used for the color word. Other forms of the Stroop Test have a trial with color names in black ink, may include the requirement to shift from naming the color of ink used to naming the color word, or may require shifts from word to color ink within a single trial (Lezak et al., 2004). Each trial is timed and the number of errors recorded.

PROBLEM-SOLVING

One of the most frequently used executive function assessments is the Wisconsin Card Sorting Test (WCST) (Lezak et al., 2004). Its purpose is to assess the ability to form abstract concepts, shift and maintain set, and utilize feedback. Four stimulus cards are presented, and the individual is given one or two packs of 64

response cards. The individual is told to match each of the cards in the deck to one of the four stimulus cards and is given feedback each time, despite whether the response is correct. Cards can be sorted by form, size, or number. Once the individual has responded correctly a specific number of times, the match rule is shifted. The individual is tested until two of the three match rules are successfully completed or until all of the cards are used. This test is useful for identifying neurocognitive problems which may be present in individuals with ADHD, brain injuries, learning disabilities, schizophrenia, or multiple sclerosis (Lezak et al., 2004). The WCST is untimed and can be administered by computer or by an examiner. It is scored for completed categories, perseveration, errors, failure to maintain set, and consecutive correct answers.

INITIATION AND PLANNING

Executive function also involves skills of initiation and planning, and various assessment tools measure these skills. The Tinkertoy Test (TTT), developed by Lezak et al. (2004), demonstrates these executive capacities. It allows individuals to independently undertake initiation, planning, and structuring of a potentially complex activity. Individuals complete a free construction without using a model to copy or a predetermined solution. Factor analysis identified four measurable variables for this test including organization, creativity, planning, and impulsivity. The TTT is administered by supplying the individual with 50 pieces of a standard Tinkertoy set and the individual is told to make whatever he/she would like in at least five minutes with more time available if needed (Lezak et al., 2004). After completion, the rater inquires as to what the individual made. Scoring is based on the number of pieces used, naming of the final product,

appropriateness of the name and/or purpose, use of moving parts, dimensionality, and ability to be free standing. Points are subtracted for unused parts and forced connections.

Another group of tests that provide assessment of initiation and planning are the “Tower” (London, Hanoi, and Toronto) tests (Lezak et al., 2004). The basic task of these three tests involves the moving of rings or blocks from their original positions on several posts to predetermined positions with as few moves as possible. The Tower of London test consists of three colored rings. The individual must move the rings to a predetermined peg and leave them in a specific order. Only one piece can be moved at a time. The Tower of London provides 12 test items of graded difficulty. Three trials are allowed for each problem and scored correct if the solution is achieved with the minimum number of moves. The Tower of Hanoi consists of five different sized rings in which a larger ring may not rest on a smaller ring increasing the complexity of the task. The Tower of Toronto requires greater problem-solving with the use of four different colored rings. Lighter colored rings must be placed on darker rings, and the rings move from left to right. These tests require the individual to create sub-goals in order to reach the final solution.

VOCATIONALLY RELEVANT TOOLS

It is undoubtedly very important to understand the impact of executive function on employment, specifically for individuals with disabilities. The Behavioral Assessment for Vocational Skills (BAVS), developed by Butler, Anderson, Furst, and Namerow (1989), provides concrete information relevant to an employment task (Spreeen & Strauss, 1998). This test allows 45 minutes to put together a mail order wheel-barrow. The rater acts as a supervisor and can provide general direction as needed

but also can interject a brief alternative task and can also give constructive criticism. The BAVS has been found to predict work performance of individuals with brain injuries in a volunteer trial work setting and is considered an important measure of executive function in rehabilitation settings.

FULL BATTERIES

Another approach to determining executive function is to use a battery that contains subtests assessing specific constructs. The Delis-Kaplan Executive Function System (D-KEFS), developed by Delis and Kaplan (2001), is one such battery (Lezak et al., 2004). It is intended to measure performance of executive function including effortful and sustained cognitive effort. It is designed to isolate and quantify specific executive function performance. The D-KEFS is comprised of nine subtests, many of which are modifications of other executive function tests (e.g., Stroop, Tower, and Sorting). The nine subtests are used with adults from ages 16 to 89 years, and only eight subtests are used for children ages 8 to 15 years. Individual subtest scores are used, and no global score is produced (Lezak et al., 2004).

The Behavioral Assessment of Dysexecutive Systems (BADS) is another battery used to measure executive function. BADS was published by Wilson, Alderman, Burgess, Emslie, and Evans (1996). Among other things, this test can be used to determine skills of daily functioning. BADS includes six subtests and a questionnaire given to both the individual and a rater which can be completed in about 30 minutes. The tests include:

- The Rule Shift Cards Test consists of 21 cards used to measure the ability to move from one rule to another and use short-term memory;

- The Action Program Test measures problem solving skills that require multiple steps;
- The Key Search Test measures problem solving efficiency;
- The Temporal Judgment Test consists of four questions requiring an understanding of time frame (specific to US and UK);
- The Zoo Map Test provides a list of locations and a zoo map. The ability to organize is assessed;
- The Modified Six Elements Test consists of three tasks (dictation, arithmetic, and picture-naming) and must be done in two parts. The subjects are not allowed to do the same task consecutively. Ability to organize is assessed; and
- The Dysexecutive Questionnaire (DEX and DEX-R) is a 20 item questionnaire that was developed to provide insight into changes in personality, motivation, behavior, and cognition. The questionnaire compares the responses given by the subject and a proxy (i.e. caregiver or relative with daily interactions with the subject).

Initial research indicates that BADS may be useful for finding subtle difficulties in planning and organization, especially in individuals that appear to be cognitively intact in structured settings (Spreen & Strauss, 1998).

ECOLOGICAL EVALUATION

One of the traditional problems with assessing executive function is that the typical testing environment provides structure that may mask the impact of executive function problems. An ecological based assessment of executive function was developed to provide insight into real world functioning. The Multiple Errands Task (MET) was developed by Shallice and Burgess (1991). This assessment occurs in a

shopping mall where the individual is given three task sets with eight instructions, and each has a different requirement (e.g., buying goods, asking for information, being at a set location at a specific time, etc.). The individual is given a list of requirements and limited rules (e.g., can only enter store to make a purchase). The individual must structure, plan, and execute the tasks efficiently, and an observer scores the attempts (Manchester, Priestley, & Jackson, 2004). A similar set of tasks has been developed for a hospital setting. Scoring is based on the quality of task planning and the actual execution of the tasks.

OTHER PSYCHOLOGICAL ASSESSMENTS

Other assessments or subtests have been used to capture executive function information. The following is a partial list of some of these tests with the specific aspect of executive function: Wechsler Adult Intelligence Scale -Digit Span (attention and memory); Paced Auditory Serial Addition Test (attention); Controlled Oral Word Association (rule following and memory); Wechsler Intelligence Scales for Children – Mazes (rule following and visual-motor coordination); Bender-Gestalt Copy Trial (organization and planning); and Wechsler Adult Intelligence Scale – Letter/Number Sequencing (rule following, attention, and information processing). In addition, information from significant others and/or family members can provide great insight into the typical executive function performance of an individual (Buros, 2006).

FUTURE DIRECTIONS

This paper provides a discussion of various assessments tools that can be used to measure aspects of executive function, along with a rationale for the need for increased attention to this domain of assessment. Rehabilitation professionals, including vocational evaluators, have a wide variety

of instruments to use if deficits in executive function are suspected. In particular, vocational assessment professionals conducting comprehensive vocational evaluations, with the focus more on hands-on types of assessment tasks as opposed to strictly paper-and-pencil instruments, will find that many of the tools can and should be used as an initial screening, or part of one. Results from these measures of executive function at the beginning of the vocational evaluation process can help to better plan for the remainder of the evaluation process by identifying and/or developing approaches to work-related tasks that focus on the client's executive functioning strengths. This will provide a more accurate assessment and improve the client's performance on situational assessments and job tryouts in real work environments. In the use of work samples, modifications could also be made to incorporate the client's previously identified abilities in the executive functioning area. Since most work samples are standardized hands-on instruments, any modifications to the original tasks would require reporting and interpreting the results in a non-standardized manner such as with behavioral observations. In addition to utilizing executive functioning measures in comprehensive vocational evaluations, they can be very helpful with less in-depth types of vocational assessment, such as screenings and clinical or exploratory levels of assessment (Thirtieth Institute on Rehabilitation Issues, 2003).

Without assessing or considering executive function within the rehabilitation process, professionals run the risk of misinterpreting a client's behaviors as resistant, lazy or lacking appropriate motivation. Such misinterpretations impact overall work performance and employment potential of individuals with disabilities. It is the responsibility of rehabilitation

counselors, vocational evaluators, and other rehabilitation professionals to consider underlying problems associated with a client's work-related behaviors, such as those with executive function, in an effort to avoid unnecessary frustration and the possibility of miscoding a client as "non-compliant".

The next step is to transfer the knowledge gained during these assessments to appropriate treatment interventions. For example, Ylvisaker and Feeney (2002) proposed intervention strategies for children in special education programs with identified executive function deficits involving stepwise, strategic habits. In addition, executive function interventions for individuals with brain injury specifically address the social, academic, and vocational barriers (Ylvisaker & DeBonis, 2000). These examples illustrate the importance of applying increased knowledge of executive function deficits to the treatment environment with the possibility of reversing some of these deficits.

Along with application in clinical practice, future research must continue to investigate appearance of executive function deficits in disability populations and related rehabilitation services. For example, additional research can more carefully define the relationship between chronic illness and problems with executive function (Schillerstrom et al., 2005); perhaps the influential factors in this relationship could be identified, and treatments planned accordingly. In addition, future research could investigate the best stage of treatment and specific techniques to appropriately address executive function deficits among individuals with substance use problems (Uekermann et al., 2003). With a clearly identified problem among individuals with substance use issues, possible treatment strategies must be researched and implemented. Additional attention to

executive function in clinical practice and research will likely improve outcomes for individuals who have ADHD, schizophrenia, brain injury, substance use, chronic illness, or experienced a stroke. Rehabilitation professionals are encouraged to continuously seek updated and detailed assessment information in order to better serve clients.

REFERENCES

- Abi-Saab, D. Fiszdon, J., Bryson, G., & Bell, M. (2005). The implications of memory profiles in schizophrenia on vocational and neuropsychological functioning. *Schizophrenia Research*, 75, 173-182. doi:10.1016/j.schres.2004.12.014
- Anderson, S. W., & Tranel, D. (1989). Awareness of disease states following cerebral infarction, dementia, and head trauma: Standardized assessment. *The Clinical Neuropsychologist* 3, 327-339.
- Anson, K., & Ponsford, J. (2006). Who benefits? Outcome following a coping skills group intervention for traumatically brain injured individuals. *Brain Injury*, 20, 1-13. doi: 10.1080/02699050500309791
- Aycicegi, A., Dinn, W. M., Harris, G. L., & Erkmen, H. (2003). Neuropsychological function in obsessive-compulsive disorder: Effects of comorbid conditions on task performance. *European Psychiatry*, 18, 241-248. doi:10.1016/S0924-9338(03)00065-8
- Barkley, R. A. (1997). *ADHD and the nature of self-control*. NY: Guilford Press.
- Bell, M. Bryson, G., & Wexler, B. E. (2003). Cognitive remediation of working memory deficits: durability of training effects in severely impaired and less severely impaired schizophrenia. *Acta Psychiatrica Scandinavica*, 108, 101-109. doi: 10.1034/j.1600-0447.2003.00090
- Buros Institute of Mental Measurements. (2006). *Mental measurements yearbook*. Retrieved from <http://digital.library.wisc.edu/1711/web/mentalmeasurementsyearbook>.
- Campodonico, J. R., & McGlynn, S. M. (1995). Assessing awareness of deficits: Recent research and applications. In L. A. Cushman & M. J. Scherer (Eds.), *Psychological assessment in medical rehabilitation* (pp.393-418). Washington, D.C.: American Psychological Association.
- Cauffman, E., Steinberg, L., & Piquero, A. R. (2005). Psychological, neuropsychological and physiological correlations of serious antisocial behavior in adolescence: The role of self-control. *Criminology*, 43, 133-175. doi: 10.1111/j.0011-1348.2005.00005
- Delis, D. C., Kaplan, E., & Kramer, J. H. (2001). *D-KEFS examiner's manual*. San Antonio, TX: Psychological Corporation.
- Dolan, M., & Park, I. (2002). The neuropsychology of antisocial personality disorder. *Psychological Medicine*, 32, 417-427. doi: 10.1017/S0033291702005378
- Draper, K., & Ponsford, J. (2008). Cognitive functioning ten years following traumatic brain injury and rehabilitation. *Neuropsychology*, 22, 618-625. doi: 10.1037/0894-4105.22.5.618
- Egger, J., De May, H., & Janssen, G. (2007). Assessment of executive functioning in psychiatric disorders: Functional diagnosis as the overture of treatment. *Clinical Neuropsychiatry*, 4, 111-116.
- Green, R.E., Colella, B., Hebert, D.A., Bayley, M., Kang, H.S., Till, C, et al. (2008). Prediction of return to productivity after severe traumatic brain injury: Investigations of optimal neuropsychological tests and timing of

- assessment. *Archives of Physical Medicine and Rehabilitation*, 89, S51-S60. doi:10.1016/j.apmr.2008.09.552
- Greenbaum, J., & Markel, G. (2001). *Helping Adolescents and ADHD and learning disabilities: Ready to use tips, techniques, and checklists for school success*. Paramus, NJ: The Center for Applied Research in Education.
- Gruber, S.A., Silveri, M.M., & Yurgelun-Todd DA. (2007). Neuropsychological consequences of opiate use. *Neuropsychological Review*, 17, 299-315.
- Krpan, K.M., Levine, B., Stuss, D.T., & Dawson, D.R. (2007). Executive function and coping at one-year post traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 29, 36-46. doi: 10.1080/13803390500376816
- Levin, H. S., & Hanten, G. (2005). Executive functions after traumatic brain injury in children. *Pediatric Neurology*, 33, 79-93. doi:10.1016/j.pediatrneurol.2005.02.002
- Lezak, M. D., Howieson, D. B., & Loring, D. W. (2004). *Neurological assessment* (4th ed.). NY: Oxford Press.
- Mackin, R.S. Horner, M.D., Harvey, R.T., & Stevens, L.A. (2005). The relationship between neuropsychological measures and employment problems in outpatients with substance abuse. *Rehabilitation Psychology*, 50, 158-163. doi: 10.1037/0090-5550.50.2.158
- Manchester, D., Priestley, N., & Jackson, H. (2004). The assessment of executive functions: Coming out of the office. *Brain Injury*, 18, 1067-1081. doi: 10.1080/02699050410001672387
- Martinez-Aran, A., Penades, R., Vieta, E., Colom, F., Reinares, M. Benabarre, A., et al. (2002). Executive function in patients with remitted bipolar disorder and schizophrenia and its relationship to functional outcome. *Psychotherapy and Psychometrics*, 71, 39-46.
- Maxmen, J. S., & Ward, N. G. (1995). *Essential psychopathology and its treatment* (2nd ed.). NY: W.W. Norton.
- Miller, E.K., & Cohen, J.D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, 24, 167-202.
- Morgenstern, J. & Bates, M.E. (1999). Effects of executive function impairment on change processes and substance use outcomes in 12-step treatment. *Journal of Studies on Alcohol*, 60, 846-856.
- Nadeau, K. G. (2005). Career choices and workplace challenges for individuals with ADHD. *Journal of Clinical Psychology*, 61, 549-563. doi: 10.1002/jclp.20119
- Owensworth, T., & Shum, D. (2008). Relationship between executive functions and productivity outcomes following stroke. *Disability and Rehabilitation*, 30, 531-540. doi: 10.1080/09638280701355694
- Reed, R. A., Harrow, M., Herbener, E. S., & Martin, E. M. (2002). Executive function in schizophrenia: Is it linked to psychosis and poor life functioning? *Journal of Nervous and Mental Disorders*, 190, 725-732.
- Reeder, C., Newton, E., Frangou, S., & Wykes, T. (2004). Which executive skills should we target to affect social functioning and symptom change? A study of a cognitive remediation therapy program. *Schizophrenia Bulletin*, 30, 87-100. doi: 643183801
- Schillerstrom, J.E., Horton, M.S., Royall, D.R. (2005). The impact of medical illness on executive function. *Psychosomatics*, 46, 508-516. doi: 926153271

- Shallice, T., & Burgess, P.W. (1991). Deficits in strategy application after frontal lobe damage in man. *Brain*, 114, 727-741.
- Siegrist, M. (1997). Test-retest reliability of different versions of the Stroop test. *Journal of Psychology*, 13, 299-306.
- Spreeen, O., & Strauss, E. (1998). A compendium of neuropsychological tests: Administration, norms, and commentary (2nd ed). New York: Oxford University Press.
- Stablum, F., Milgrana, L., Sgaramella, T., Bortolon, F., & Toso, V. (2004). Endogenous task shift processes in relapsing-remitting multiple sclerosis. *Brain and Cognition*, 56, 328-331. doi:10.1016/j.bandc.2004.08.048
- Stavro, G.N., Ettenhofer, M.L., & Nigg, J.T. (2007). Executive functions and adaptive functioning in young adult attention-deficit/hyperactivity disorder. *Journal of the International Neuropsychological Society*, 13, 324-334.
- Struchen, M.A., Roebuck, T.M., Pappadis, M.R., & Ferguson, J.E. (2008). *I have what?! A guide to living with traumatic brain injury*. Houston, Texas: RRTC on Community Integration of Persons with TBI.
- Teasdale, T.W., & Engberg, A.W. (2005). Psychosocial consequences of stroke: A long-term population based follow-up. *Brain Injury*, 19, 1049-1058. doi: 10.1080/02699050500110421
- Thirtieth (30th) Institute on Rehabilitation Issues. (2003). *A new paradigm for vocational evaluation: Empowering the vr consumer through vocational information*. University of Arkansas CURRENTS: Author.
- Turkstra, L. S., & Flora, T. L. (2002). Compensating for executive function impairment after TBI: A single case study of functional intervention. *Journal of Communicative Disorders*, 35, 467-482.
- Uekermann, J., Daum, I., Schlebusch, P., Wiebel, B., & Trenckmann, U. (2003). Research report: Depression and cognitive functioning in alcoholism. *Addiction*, 98, 1521-1529. doi: 10.1046/j.1360-0443.2003.00526
- Washton, A., & Zweben, J.E. (2009). *Cocaine and Methamphetamine Addiction*. New York: W.W. Norton & Company Inc.
- Wasserstein, J. (2005). Diagnostic issues for adolescents and adults with ADHD. *Journal of Clinical Psychology*, 61, 535-547.
- Willcutt, E. G., Doyle, A. E., Nigg, J. T., Farone, S. V., & Pennington, B. F. (2005). Validity of the executive function theory of Attention-Deficit/Hyperactivity Disorder: A meta-analytic review. *Biological Psychiatry*, 57, 1336-1346. doi:10.1016/j.biopsych.2005.02.006
- Ylvisaker, M., & DeBonis, D. (2000). Executive function impairment in adolescence: TBI and ADHD. *Topics in Language Disorders*, 20, 29-57.
- Ylvisaker, M., & Feeney, T. (2002). Executive functions, self-regulation, and learned optimism in paediatric rehabilitation: A review and implications for intervention. *Pediatric Rehabilitation*, 5, 51-70. doi: 10.1080/1363849021000041891
- Zinn, S., Bosworth, H.B., Hoenig, H.M., & Swartzwelder, S. (2007). Executive function deficits in acute stroke. *Archives of Physical Medicine and Rehabilitation*, 88, 173-180. doi:10.1016/j.apmr.2006.11.015
- Zinn, S., Stein, R. & Swartzwelder, H.S. (2004). Executive functioning early in abstinence from alcohol. *Alcoholism: Clinical and Experimental Research*, 28, 1338-1

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VALIDITY OF THE O*NET ABILITY PROFILER FOR USE IN COMPREHENSIVE VOCATIONAL EVALUATIONS

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ABSTRACT

The Ability Profiler and WAIS-III measure similar aptitudes and abilities. The researchers explored the relationship between the tests to validate the use of the Ability Profiler for vocational evaluation. The sample consisted of 326 individuals from a Midwestern vocational evaluation center. Percentile rank scores from both the Ability Profiler and the WAIS-III were compared. Results showed moderate correlations between the two tests. However, when the sample was separated into two groups (cognitive and orthopedic/health impairment) scores in the orthopedic/health groups tended to show stronger correlation than the cognitive group scores. Several possible explanations are presented.

INTRODUCTION

The 2008 Commission on Accreditation of Rehabilitation Facilities (CARF) manual defines a comprehensive vocational evaluation as a service that provides an individualized, timely, and systematic process in which a person seeking employment, in partnership with an evaluator, learns to identify viable vocational options and develop employment goals and objectives (CARF, 2008). To acquire CARF accreditation for comprehensive vocational evaluation services, a facility must meet 11 standards, including the measurement of aptitude and ability using standardized, valid, and reliable tests. One method of verifying valid test instruments is through correlation studies in which a less established instrument is compared to an established instrument with similar constructs. In these studies positive correlations suggest a valid test instrument.

Created to replace the Dictionary of Occupational Titles (DOT) (O*NET, 2002), the Occupational Information Network

(O*NET) was released in 1997 by the Department of Labor (DOL). A refined O*NET was made available to the general public in December 1998 (Mariani, 1999). The O*NET is a computerized database with the main purpose of providing a standard occupational classification (SOC) for federal agencies and others utilizing occupational information. It is common for facilities providing comprehensive vocational evaluations to use the O*NET. The O*NET has identified 1,102 occupations, much fewer than the DOT's 12,741. Specific data element factors found in each occupation (i.e., abilities, interests, and work values) are also identified. The O*NET Career Exploration Tools, which include the Career Interest Inventory, Work Values Inventory, and Ability Profiler, were developed by the DOL to identify specific data element factors (O*NET, 2002).

The O*NET Ability Profiler is a multiple ability test battery that has replaced the Department of Labor's General Aptitude Test Battery (GATB). The GATB is a multi-

iple aptitude test battery that was created to provide a measure of nine occupation-related aptitudes, though its ability to do so has been disputed (Hammond, 1984; Watts & Everitt, 1980). Historically the GATB provided measures of aptitudes (General Learning Ability, Verbal Ability, Numerical Ability, Spatial Ability, Form Perception, Motor Coordination, Finger Dexterity, Manual Dexterity, and Clerical Perception) that are commonly used for comprehensive vocational evaluations. The O*NET Ability Profiler, which was developed using GATB constructs, provides a measure of similar aptitudes, even sharing similar subtests (GATB Forms E & F are Ability Profiler Forms 1 & 2) (Mellon, Daggett, MacManus, & Moritsch, 1996; Segall & Monzon, 1995).

According to the O*NET Occupational Information Network Knowledge Site (2002), the Ability Profiler measures the following:

- *Verbal Ability* - Understanding of meaning of written words and using them correctly in good communication when you listen, speak, or write;
- *Arithmetic Reasoning* - The ability to use several math skills and logical thinking to solve problems in everyday situations;
- *Computation* - The ability to use arithmetic operations of addition, subtraction, multiplication, and division to solve everyday problems involving numbers;
- *Spatial Ability* - The ability to form pictures of objects in the mind, easily understanding how drawings represent real objects and correctly imagining how parts fit together;
- *Form Perception* - Ability to see details in objects, pictures, or drawings quickly and correctly;
- *Clerical Perception* - The ability to see details in written materials quickly and correctly;

- *Motor Coordination* - The ability for different parts of the body to work well together;
- *Finger Dexterity* - The ability to move the fingers skillfully and easily to handle small objects quickly and accurately; and
- *Manual Dexterity* - The ability to move the hands skillfully and easily so as to place and turn objects quickly and accurately.

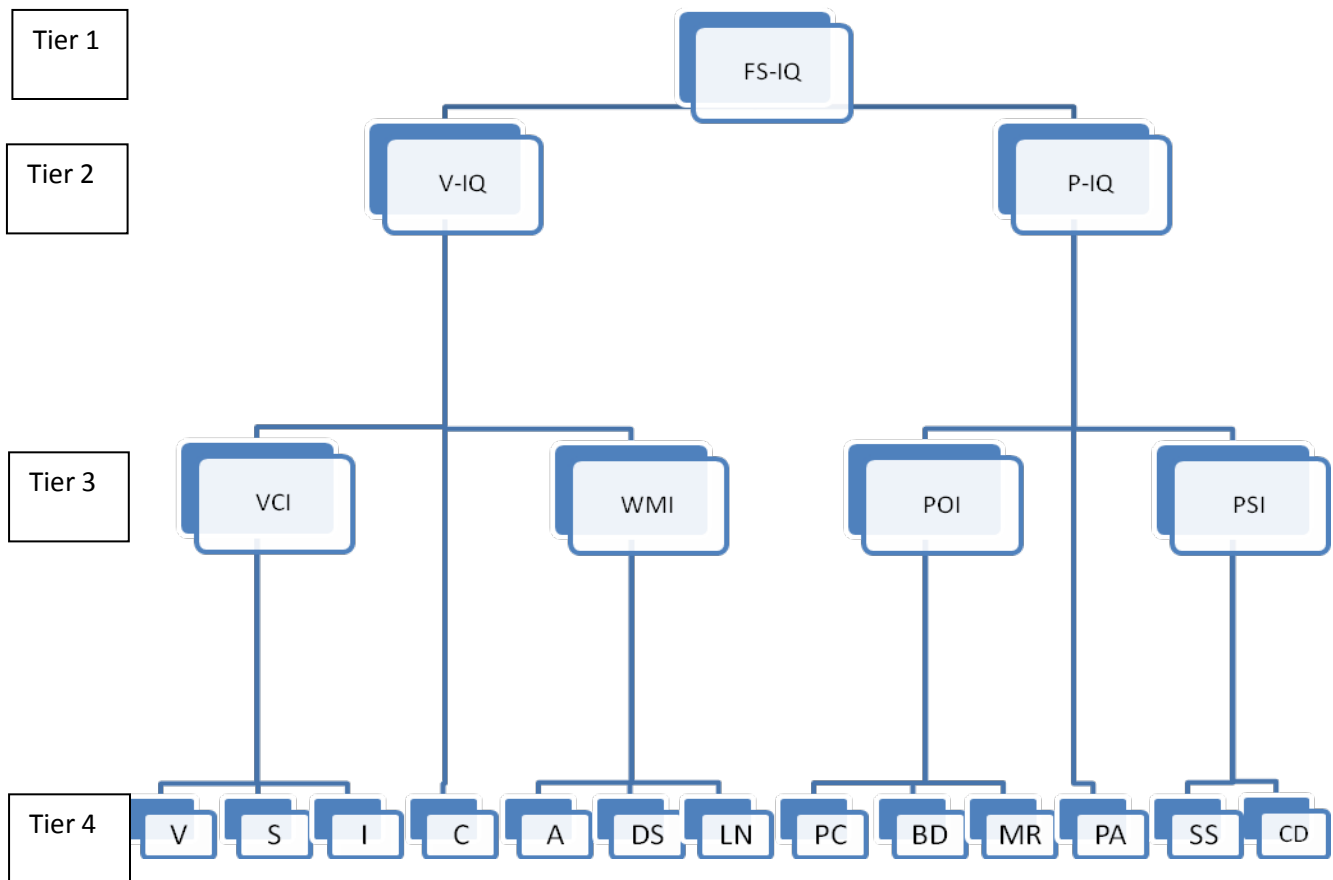
Aptitude, ability, and intelligence are sometimes considered synonymous. An aptitude is a natural ability and ability is a natural aptitude or acquired proficiency (Merriam-Webster online dictionary). Wechsler (1944) defined intelligence as “the capacity to act purposefully, to think rationally, and to deal effectively with his [or her] environment” (p. 3). His concept of intelligence was that of a global entity, which could also be categorized by the sum of many specific abilities (Kaufman & Lightenberger, 1999). The Wechsler Adult Intelligent Scale-III (WAIS-III) is an intelligence test that yields a verbal IQ, performance IQ, full-scale IQ and index scores of verbal comprehension, perceptual organization, working memory, and processing speed based on a number of selected subtests. Though the O*NET Ability Profiler and WAIS-III do not measure identical abilities, each assesses abilities that are vocationally relevant.

The WAIS-III is structured as a Four-Tier Hierarchy (see Table 1). Full-scale IQ (Tier 1) is derived from Verbal IQ (Tier 2) and Performance IQ (Tier 2). Tier 3 consists of the four index scores (Verbal Comprehension, Working Memory, Perceptual Organization, and Processing Speed). Tier 4 consists of the 13 subtests, which assess the following abilities:

- *Information* - fund of knowledge acquired through school and cultural experience;
- *Vocabulary* - listening vocabulary;

- *Similarities* – ability to find and synthesize relationships;
- *Comprehension* - practical information and social knowledge;
- *Arithmetic* - mental concentration and computation skill;
- *Digit Span* - short-term memory (by requiring the individual to recall increasingly longer strings of numbers);
- *Letter-Number Sequencing* – sequential processing (by requiring an individual to correctly order letters and numbers presented orally);
- *Picture Arrangement* - nonverbal reasoning and planning;
- *Picture Completion* - attention to detail and visual recognition of objects;
- *Matrix Reasoning* - nonverbal perceptual reasoning (by requiring an individual to complete the missing portion of abstract patterns);
- *Block Design* - visual spatial integration,
- *Digit-Symbol Coding* - accuracy and speed of visual motor coordination and scanning ability; and
- *Symbol Search* - measures speed, accuracy, and attention.

Table 1: WAIS-III Structure: Four-Tier Hierarchy



FS-IQ = Full Scale IQ; V-IQ = Verbal IQ; P-IQ = Performance IQ; VCI = Verbal Comprehension Index; WMI = Working Memory Index; POI = Perceptual Organization Index; PSI = Processing Speed Index; V = Vocabulary; S= Similarities; I = Information; C = Comprehension; A = Arithmetic; DS = Digit Span; LN = Letter-Number Sequencing; PC = Picture Completion; BD = Block Design; MR = Matrix Reasoning; PA = Picture Arrangement; Cd = Digit Symbol-Coding; SS = Symbol Search.

Wechsler Adult Intelligence tests have been used to predict employment success (Faas & D'Alonzo, 1990). The Ability Profiler is used to measure work-related abilities in order to identify jobs consistent with an individual's abilities. Though the subtests of the O*NET Ability Profiler and WAIS-III measure different abilities, both tests include similar constructs (i.e., Verbal Ability (O*NET) and Verbal Comprehension (WAIS-III)). Thus, a correlation study comparing O*NET Ability Profiler subtests with WAIS-III IQ and index scores could further validate the O*NET Ability Profiler and its use for comprehensive vocational evaluations.

METHODS

SETTING

After receiving permission from rehabilitation center and approval from the Southern Illinois University Carbondale Human Subjects Committee data were collected from a sample of customer records from a Midwestern state's vocational rehabilitation program, spanning nearly seven years, referred to a community rehabilitation center for comprehensive vocational evaluations. The rehabilitation center is part of a local university and serves as a rehabilitation service provider for the southern part of the state.

INSTRUMENTS

The O*NET Career Exploration Tools are used in vocational evaluations and many state rehabilitation counselors refer customers for psychological evaluations as part of their referral for vocational evaluations. Psychological evaluations include the administration of the Wechsler Adult Intelligence Scale—III (WAIS-III). For those individuals who had been administered both the WAIS-III and the O*NET Ability Profiler—one of the O*NET Career Exploration Tools, a data sheet was completed. Demographic information (i.e., ID

number, age, gender, race, years of education, participation in special education, presence of work history, participation in competitive employment, and primary disability) as well as O*NET Ability Profiler and WAIS-III percentile rank scores were recorded. Percentile rank scores for both the Ability Profiler and WAIS-III represent the individuals' standardized score according to each test's norms.

PARTICIPANTS

Four hundred archived records were gathered. Three hundred and twenty-six of those had complete data for both the Ability Profiler and WAIS-III, which allowed for analysis. The participants' ages ranged from 17 to 59 years old, with 18 being the most common (10%). The sample consisted of 211 men (65%) and 115 women (35%). There were 303 Caucasian and 21 African American participants. Most (n = 199) of the participants were high school graduates with many (n = 83) having some college education. Two had attained a graduate degree or higher. Sixty-four (19.6%) of the participants had received some form of special education. Two hundred eighty-five of the participants had at least one year of work history and 79.4% of the participants had attained competitive employment. Sample demographics differ slightly from U.S. Census Bureau state of Illinois demographics (Male = 48.9%, Median age = 35.3, Caucasian = 75%, African-American = 14.9%, High School graduates = 85.2%, Persons with disabilities = 9.3%). Descriptive statistics are shown in Table 2.

DISABILITY

Participants were classified into 23 disabilities with disabilities in italics representing those most likely, though not definitively, to result in cognitive impairment (*Visual Impairment, Hearing Impairment, Orthopedic, Absence of Limb/Amputation, Mental Illness, Chemical*

Table 2: Descriptive Characteristics

Independent Variables	Number (%)	Mean, SD	Mode
Age	326 (100%)	34 (12.68)	18 (10%)
Gender			
Male	211 (65%)		
Female	115 (35%)		
Race			
Caucasian	303 (92.9%)		
African-American	21 (6.4%)		
Other	0 (0%)		
Unknown	2 (0.6%)		
Years of Education	320 (98.2%)	12.18(1.74)	12 (61%)
Received Special Ed.	64 (19.6%)		
Work History	285 (87.4%)		
Competitive Work History	259 (79.4%)		
Disability Group			
Cognitive	114 (35%)		
Orthopedic/health	212 (65%)		

Dependency, Specific Learning Disability, Mental Retardation, Blood Disorders, Allergic Disorders, Diabetes, Endocrine System Disorders, Nervous System Disorders including Epilepsy, Cardiac and Circulatory Disorders, Respiratory Disorders, Disorders of the Digestive System, Genito-Urinary System Disorders, Speech Impairment, Skin Cellular Tissue Disorders, Other Disabilities, TBI, & Autism). The researchers acknowledge disabilities not placed in the cognitive impairment category could result in impaired cognitive functioning. For those with multiple disabilities, a determination was made by an expert certified vocational evaluator as to which was the primary disability. The three most common disabilities were Orthopedic (n=103, 32%), Specific Learning Disability (n=86, 27%), and Mental Illness (70, 22%).

Previous research (Jones, Schaik, & Witts, 2006; Snow, Koller, & Roberts, 1987)

suggested intelligence tests are inconsistent when assessing the low-IQ population, which can often be a characteristic of disability population with cognitive impairments. To explore the relationship between disability category, disability types were separated into two groups cognitive (n=114, 35%) and orthopedic/health (n=212, 65%).

RESULTS

Complete Sample (n=326)

All participants completed both the O*NET Ability Profiler and the WAIS-III at relatively the same point in time. Both the O*NET Ability Profiler and WAIS-III have two scores that, when combined, tend to reflect overall ability/intelligence. For the Ability Profiler it is the Verbal Ability and Arithmetic Reasoning aptitudes, and for the WAIS-III it is the Verbal IQ and Performance IQ. As a frame of reference for the general relationship between these two

sets of scores, O*NET Ability Profiler Verbal Ability and O*NET Ability Profiler Arithmetic Reasoning were moderately correlated (.522, $p < .01$) though not as strongly correlated as WAIS-III Verbal IQ and WAIS-III Performance IQ (.621, $p < .01$).

Correlation analyses supported the hypothesis that O*NET Ability Profiler scores would significantly correlate with WAIS-III scores (see Table 3). O*NET Ability Profiler Verbal Ability and WAIS-III Verbal IQ showed a moderate correlation (.677, $p < .01$) as did O*NET Ability Profiler Verbal Ability and WAIS-III Full Scale IQ (.624, $p < .01$). The relationship between O*NET Ability Profiler Verbal Ability and WAIS-III Performance IQ, though still significant, was weaker (.426, $p < .01$). As

expected, the O*NET Ability Profiler Verbal Ability moderately correlated with the WAIS-III Verbal Comprehension Index (.651, $p < .01$). WAIS-III Full Scale IQ moderately correlated with O*NET Ability Profiler Arithmetic Reasoning (.649, $p < .01$). In addition, the WAIS-III Perceptual Organization Index moderately correlated with O*NET Ability Profiler Spatial Ability (.680, $p < .01$). Though there is similarity in what is being measured by the WAIS-III Perceptual Organization Index and O*NET Ability Profiler Form Perception subtest and the WAIS-III Verbal Comprehension Index and the O*NET Ability Profiler Clerical Perception subtest, the correlations, .425, $p < .01$ and .282, $p < .01$ respectively, reflect a weak relationship.

Table 3: Correlation Table for Complete Sample

Significance level: * $< .05$, ** $< .01$

	Abil. Prof. Vrb. Abil.	Abil.Prof. Arith. Reas.	Abil. Prof. Form Per.	Abil. Prof. Cler. Per.	Abil. Prof. Spat. Per.	WAIS-III Vrb. IQ	WAIS-III Perf. IQ	WAIS-III FS IQ	WAIS-III Vrb. Comp.	WAIS-III Per. Org.
Abil. Prof. Vrb. Abil.	1.000									
Abil.Prof. Arith. Reas.	.522**	1.000								
Abil. Prof. Form Per.	.132**	.264**	1.000							
Abil. Prof. Cler. Per.	.346**	.453**	.633**	1.000						
Abil. Prof. Spat. Per.	.304**	.450**	.350**	.272**	1.000					
WAIS-III Vrb. IQ	.677**	.639**	.285**	.367**	.480**	1.000				
WAIS-III Perf. IQ	.426**	.516**	.481**	.458**	.646**	.621**	1.000			
WAIS-III FS IQ	.624**	.649**	.411**	.453**	.609**	.914**	.874**	1.000		
WAIS-III Vrb. Comp.	.651**	.491**	.210**	.282**	.424**	.913**	.547**	.830**	1.000	
WAIS-III Per. Org.	.376**	.466**	.425**	.357**	.680**	.596**	.934**	.831**	.516**	1.000

Persons with Orthopedic/Health Primary Disability (n=212)

Similar to the entire sample, O*NET Ability Profiler Verbal Ability and O*NET Ability Profiler Arithmetic Reasoning were moderately correlated (.538, $p < .01$) though not as strong as WAIS-III Verbal IQ and WAIS-III Performance IQ (.632, $p < .01$).

The relationships between the two test scores (O*NET Ability Profiler and WAIS-III) remained consistent (see Table 4). However, there is noticeable difference in the degree to which the individual tests, subtests, and index scores correlated. All except for three (WAIS-III Perceptual Organization Index and O*NET Ability

Table 4: Correlation Table for Orthopedic/Health Disability Group

Significance level: * $<.05$, ** $<.01$

	Abil. Prof. Vrb. Abil.	Abil.Prof. Arith. Reas.	Abil. Prof. Form Per.	Abil. Prof. Cler. Per.	Abil. Prof. Spat. Per.	WAIS-III Vrb. IQ	WAIS-III Perf. IQ	WAIS-III FS IQ	WAIS-III Vrb. Comp.	WAIS-III Per. Org.
Abil. Prof. Vrb. Abil.	1.000									
Abil.Prof. Arith. Reas.	.538**	1.000								
Abil. Prof. Form Per.	.191**	.304**	1.000							
Abil. Prof. Cler. Per.	.277**	.426**	.641**	1.000						
Abil. Prof. Spat. Per.	.320**	.438**	.327**	.249**	1.000					
WAIS-III Vrb. IQ	.729**	.654**	.312**	.329**	.473**	1.000				
WAIS-III Perf. IQ	.478**	.564**	.490**	.443**	.643**	.632**	1.000			
WAIS-III FS IQ	.673**	.680**	.436**	.425**	.606**	.916**	.883**	1.000		
WAIS-III Vrb. Comp.	.680**	.494**	.192**	.226**	.385**	.910**	.520**	.804**	1.000	
WAIS-III Per. Org.	.428**	.491**	.424**	.339**	.669**	.600**	.937**	.834**	.484**	1.000

Profiler Form Perception subtest, WAIS-III Perceptual Organization Index and Spatial Ability subtests, and the WAIS-III Verbal Comprehension Index and O*NET Ability Profiler Clerical Perception) had stronger correlations than the comparable in the cognitive disability group.

Persons with Cognitive Primary Disability (n=114)

Similar to the entire sample, O*NET Ability Profiler Verbal Ability and O*NET Ability Profiler Arithmetic Reasoning were moderately correlated (.438, $p<.01$) though not as strong as WAIS-III Verbal IQ and WAIS-III Performance IQ (.624, $p<.01$). The relationships between the two test scores (O*NET Ability Profiler and WAIS-III) remained consistent (see Table 5). However, there is noticeable difference in the degree to which the individual tests, subtests, and index scores correlated. All except for three (WAIS-III Perceptual Organization Index and O*NET Ability Profiler Form Perception subtest, WAIS-III Perceptual Organization Index and Spatial Ability

subtests, and the WAIS-III Verbal Comprehension Index and O*NET Ability Profiler Clerical Perception subtest) had weaker correlations.

DISCUSSION

A review of the correlation comparison table (see Table 6) identifies the relationships between the two groups (cognitive and orthopedic/health) in comparison to the complete sample. On average, the orthopedic/health disability group shows higher correlation coefficients than the cognitive disability group. The biggest exception to this trend is in the relationship between the Spatial Ability scored of the Ability Profiler and the WAIS-III Perceptual Organization Index. Of the specific relationships being explored, this relationship in the cognitive disability group was the only strong correlation (.700, $p<.01$). Construct validity, scatter, method of comparison, Spearman's g , and an inherent discrepancy are some factors that may explain the relationships between the variables.

Table 5: Correlation Table for Cognitive Disability Group

Significance level: *<.05, **<.01

	Abil. Prof. Vrb. Abil.	Abil.Prof. Arith. Reas.	Abil. Prof. Form Per.	Abil. Prof. Cler. Per.	Abil. Prof. Spat. Per.	WAIS-III Vrb. IQ	WAIS-III Perf. IQ	WAIS-III FS IQ	WAIS-III Vrb. Comp.	WAIS-III Per. Org.
Abil. Prof. Vrb. Abil.	1.000									
Abil.Prof. Arith. Reas.	.438**	1.000								
Abil. Prof. Form Per.	.084	.228**	1.000							
Abil. Prof. Cler. Per.	.401**	.464**	.664**	1.000						
Abil. Prof. Spat. Per.	.312**	.487**	.389**	.324**	1.000					
WAIS-III Vrb. IQ	.546**	.584**	.269**	.397**	.513**	1.000				
WAIS-III Perf. IQ	.386**	.451**	.466**	.503**	.650**	.624**	1.000			
WAIS-III FS IQ	.529**	.578**	.388**	.486**	.625**	.908*	.871**	1.000		
WAIS-III Vrb. Comp.	.590**	.459**	.263**	.349**	.500**	.916**	.608**	.874**	1.000	
WAIS-III Per. Org.	.345**	.448**	.426**	.409**	.700**	.620**	.928**	.844**	.591**	1.000

Table 6: Correlation Comparison Table

Significance level: *<.05, **<.01

Variables	Complete	Cognitive Disability	Orthopedic/Health Disability
Ability Profiler (Verbal Ability) & WAIS-III (Full Scale IQ)	.624**	.529**	.673**
Ability Profiler (Verbal Ability) & WAIS-III (Verbal IQ)	.677**	.546**	.729**
Ability Profiler (Verbal Ability) & WAIS-III (Verbal Comprehension Index)	.651**	.590**	.680**
Ability Profiler (Arithmetic Reasoning) & WAIS-III (Full Scale IQ)	.649**	.578**	.680**
Ability Profiler (Form Perception) & WAIS-III (Perceptual Organization Index)	.425**	.426**	.424**
Ability Profiler (Clerical Perception) & WAIS-III (Verbal Comprehension Index)	.282**	.349**	.226**
Ability Profiler (Spatial Ability) & WAIS-III (Perceptual Organization Index)	.680**	.700**	.669**

Construct validity has to do with the extent to which a measurement corresponds to theoretical concepts concerning the phenomenon under study. Snow, Koller, Roberts (1987), using factor analysis on the WAIS-R, suggested sensitivity to variation of cognitive abilities for the adolescent and adult learning disability population. The WAIS-III contains 212 of the original WAIS-R items plus 130 new items. Jones, Shaik, & Witts (2006), in their factor analysis study of the WAIS-III, found that the four-factor solution which underlies WAIS-III index scores is not supported in a low IQ population. The structure of the WAIS-III not effectively translating to the low-IQ population would explain why we found a stronger relationship in the orthopedic/health versus cognitive disability group. Given the literature and this study's findings, it is reasonable to question the construct validity of the WAIS-III four-factor structure when assessing individuals with disabilities that may result in cognitive impairment.

Intra-subtest scatter (ISS) is a tendency toward unusual patterns in responses to test items (Wechsler, 1958). Items on the Wechsler scales are ordered from easiest to most difficult. Thus, inconsistent patterns where an individual gets some of the easier items wrong while getting the harder items correct, or a tendency toward isolated failures within long runs of correct responses is called intra-subtest scatter (Godber & Anderson, 1996). An additional explanation for this study's findings may be that neurological functioning may differ as a function of intelligence, which could be represented differently in each of the two tests. Ryan, Tree, Morris & Gontkovsky (2006), when comparing the scatter ranges for brain-damaged participants with the WAIS-III standardization sample, found full-scale IQ is significantly correlated with amount of scatter, with

subtest scatter significantly greater for participants with IQs of 90 or above.

Using correlation analysis as a method of comparison may have limitations for individuals with cognitive disabilities. For example, in his comparison of two intelligence tests with individuals with low IQs, Umphress (2008) found that, because of the variation in non-verbal and verbal scores, it is possible to have a high correlation and yet have significantly different means and/or standard deviations. This may suggest using correlation analyses with low-IQ individuals is not an effective way to effectively determine relationships.

The controversial psychological concept of general intelligence or Spearman's *g* may also help explain the relationship between the variables. The concept of *g* suggests there is a hierarchical structure of mental abilities, with the *g* factor at the top (Johnson, Bouchard, Jr., Krueger, McGue, & Gottesman, 2004). Given that both the WAIS-III and Ability Profiler measure mental abilities, we would expect each to be measuring an aspect of *g*. Although the presence of *g* would explain the general strength of the relationship between these two tests, it does not necessarily explain the differing correlation coefficients given the presence of cognitive disability.

Finally, there is an inherent discrepancy in that the two tests are not measuring the same thing. The O*NET Ability Profiler is a measure of occupationally-related abilities, whereas the WAIS-III is a measure of intelligence. Though both are predictive of vocational capability, one would expect some variation in the meaningfulness of each test's standardized scores predicting the other test's intended construct. That is to say, we would not expect the Ability Profiler percentile score to be 100% accurate in predicting intelligence, nor would we expect a WAIS-III percentile score to be

100% accurate in predicting its similar Ability Profiler score.

The current study's findings show strong relationships between the Ability Profiler Verbal Ability and WAIS-III Full Scale IQ, Ability Profiler Verbal Ability and WAIS-III Verbal IQ, Ability Profiler Verbal Ability and WAIS-III Verbal Comprehension Index, Ability Profiler Arithmetic Reasoning and WAIS-III Full Scale IQ, and Ability Profiler Spatial Ability and WAIS-III Perceptual Organization Index. Intelligence is an established predictor of vocational placement, and these findings support the use of the O*NET Ability Profiler for use in comprehensive vocational evaluations. These findings are of particular importance because many vocational evaluators are not qualified to administer and/or interpret the WAIS III but are qualified to administer and interpret the O*NET Ability Profiler. The study provides potential areas for future exploration, especially the relationship between low ability/IQ and high ability/IQ.

LIMITATIONS

This was a one-center study from a Midwestern part of the country, which could reduce the generalizability of the findings. Most of the sample had multiple disabilities, which may have had an impact on the discrepancy between those classified into the orthopedic/health and cognitive groups. There have been few studies using the O*NET Ability Profiler and even fewer looking at use of the O*NET Ability Profiler with the disability population. This paucity of comparative literature restricts our understanding and ability to make comparisons based on performance of individuals with varying intelligence.

REFERENCES

Commission on Accreditation of Rehabilitation Facilities (CARF) (2008).

CARF Employment and Community Services Standard Manual. Tucson, AZ: Author.

- Faas, L. A. & D'Alonzo, B. J. (1990). WAIS-R scores as predictors of employment success and failure among adults with learning disabilities. *Journal of Learning Disabilities*, 23, 5, 311-316.
- Godber, T. & Anderson, V. (1996). Intrasubtest scatter in paediatric neuropsychology. *Rasch Measurement Transactions*, 9, 4, p. 469.
- Hammond, S. M. (1984). An investigation into the factor structure of the General Aptitude Test Battery: *Journal of Occupational Psychology*, 57, 1, 43-48.
- Johnson, W., Bouchard, Jr., T. J., Krueger, R. F., McGue, M., & Gottesman, I. I. (2004). Just one g: Consistent results from three test batteries. *Intelligence*, 32, 1, 95-107. doi: 10.1016/S0160-2896(03)00062-X
- Jones, J.J.S., Schaik, P.V., Witts, P. (2006). A factor analysis of the Wechsler Adult Intelligence Scale 3rd edition (WAIS-III) in a low IQ sample. *British Journal of Clinical Psychology*, 45, 145-152.
- Kaufman, A.S., Lichtenberger, E.O. (1999). *Essentials of WAIS-III assessment*. John Wiley & Sons, Inc. New York, NY.
- Mariani, M. (1999). Replace with a database: O*NET replaces the dictionary of occupational titles. *Occupational Outlook Quarterly*, 43, 1, 2-9. Retrieved September 5, 2008 from <http://www.bls.gov/opub/ooq/1999/Spring/art01.pdf>.
- Mellon, S.J., Daggett, M., MacManus, V., Moritsch, B. (1996). Development of the GATB forms E and F. In R.A. McCloy, T.L. Russell, & L.L. Wise (Eds.), *GATB improvement project final report*. Washington, DC: U.S. Department of Labor.
- Merriam-Webster Online Dictionary. (2008). *Ability*. Retrieved October 3,

- 2008, from <http://www.merriam-webster.com/dictionary/ability>
Merriam-Webster Online Dictionary. (2008). *Aptitude*. Retrieved October 3, 2008, from <http://www.merriam-webster.com/dictionary/aptitude>
- O*NET Occupational Information Network Knowledge Site. (2002). Retrieved September 5, 2008 from <http://www.dictionar-occupationaltitles.net/>.
- O*NET Resource Center site. (2002) Retrieved October 3, 2008 from <http://www.onetcenter.org/tools.html>
- Ryan, J.J., Tree, A.T., Morris, J., & Gontkovsky, S.T. (2006). Wechsler Adult Intelligence Scale-III inter-subtest scatter: A comparison of brain-damaged patients and normal controls. *Journal of Clinical Psychology, 62, 10, 1319-1326*.
- Segall, D.O. & Monzon, R.I. (1995). *Equating forms E and F of the P&P-GATB*. Monterey, CA: Navy Personnel Research and Development Center.
- Snow, J.H., Koller, J.R., Roberts, C.D. (1987). Adolescent and adult learning disability subgroups based on WAIS-R performance. *Journal of Psychoeducational Assessment, 5, 7-14*
- Umphress, T. (2008). A comparison of low IQ scores from the Reynolds Intellectual Assessment Scales and the Wechsler Adult Intelligence Scale—3rd edition. *Intellectual and Developmental Disabilities, 46, 3, 229-233*
- U.S. Census Bureau, American Community Survey Office. (2003). *State of Illinois Data Profile*. Retrieved from <http://www.census.gov/acs/www/Products/Profiles/Single/2003/ACS/IL.htm>.
- Watts, F.N. & Everitt, B.S. (1980). The factorial structure of the General Aptitude Test Battery. *Journal of Clinical Psychology, 36, 763-767*.

Wechsler, D. (1944). *The measurement of adult intelligence* (3rd ed.). Baltimore: Williams & Wilkens.

Wechsler, D. (1958). *Measurement and Appraisal of Adult Intelligence* (4th ed.) Baltimore: Williams and Wilkins.

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Mr. Nicholas Cioe will be graduating from the Southern Illinois University—Carbondale (SIUC) Rehabilitation Counselor Training Master’s Program and will begin his doctoral studies in Rehabilitation Counseling and Administration, specializing in Brain Injury Rehabilitation, in August 2009. Currently, Mr. Cioe is working as a brain injury rehabilitation counselor at the Center for Comprehensive Services. His research history includes animal behavior, mood and anxiety disorders, PTSD, sleep apnea, work ability assessments, and perception of functioning following brain injury. In addition, Mr. Cioe is the former Secretary and President-Elect, and current President of the SIUC student chapter of the National Rehabilitation Association and has been a member of the Brain Injury Association of Rhode Island since 2002.

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VECAP WHITE PAPER ON “FUNCTIONAL VOCATIONAL EVALUATION”

(in support of requirements in IDEIA)

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ABSTRACT

Developments stemming from changed language in IDEIA 2004 have put a renewed spotlight on the concepts, importance, and practices of functional vocational evaluation (FVE). This paper presents the national VECAP workgroup examination of the foundations of (and contrasting opinions about) the topic, discusses the transition requirement of functional vocational evaluation and proposes a working definition as a framework and set of strategies for practical implementation of FVE, and as a platform for dialogue with other professional groups having an intrinsic interest in the topic.

(This project is the result of a national VECAP workgroup, with the primary author compiling and synthesizing the discussions, references, feedback from several conferences and views that represent the major workgroup findings.)

RATIONALE

Recent developments stemming from changed language in IDEIA 2004 have put a renewed emphasis on the concepts, importance, and practices of “Functional Vocational Evaluation” (FVE). Vocational Evaluation and Career Assessment Professionals (VECAP) both have special interest and special expertise in this topic and also have a collaborative leadership role in promoting meaningful concepts; situating the importance within a context of students making a transition to the adult world of work; and fostering practices that are current, ethical, professional and empirically sound.

HISTORICAL INFLUENCES

The general concept of functional assessment is hardly new, even with regard to the particular population of students with disabilities who are nearing their transition to the adult world of work and independent living. At least an intrinsic nod to this was contained within the original PL 94-142 as it noted the need to comprehensively assess students’ abilities and needs. Many students it addressed were not compatible subjects with many of the typical standardized academic tests used to assess students. Similarly in the overall rehabilitation community, the 1973 Rehabilitation Act specifically directed further investigation into how better to assess the needs of persons

with severe disabilities. The specific term of “functional vocational evaluation” emerged from IDEA in 1990 as an optional service within the Transition Services definition. In IDEA 2004 it became a required service.

However, as often happens with legislation, some of the expert advisors to Congress came from vocational rehabilitation backgrounds where the word “functional” has specific meaning, such as “what is the person able to do?” or “what is the person limited in doing?” But at the other end, people responsible for implementing FVE had little guidance.

Many efforts have come previously in this area. In their introductory section of the Functional Assessment Inventory manual, Crewe and Athelstan (1984) cited some of the many conferences, symposia, and institutes on the topic of functional assessment in the rehabilitation community in the mid- to late 1970’s and early 1980’s. Various frameworks and discussions have been proposed since then. (cf, NICHCY, 1990; Brodin & Thomas, 1995; Friedman, et al, 1996; Gregg & Curtis, 1996; Wheeler, 1996; Duffy, 1997; Dean, et al., 2006).

There should be at least some recognition that what continues to drive this topic involves forces outside of education. It has already been noted above that students with disabilities were not always well served by traditional academic tests. Indeed, in the traditional world of the comprehensive vocational evaluation, the evaluation was defined by its basis in work, real and simulated. But a variety of economic forces – including the demands of employers for more pre-qualified applicants and the drive to serve more persons with less resources, among others – led to what Woodford and Modahl (1999) observed: that from the 1980’s forward, Vocational Evaluation has trended toward shorter, more uniform and more psychometric evaluations. Frankly, this has mirrored what has happened in the larger,

non-rehabilitation world of career assessment and employment services – more testing of employee-applicants as regards to skills, trustworthiness, general cognitive ability, and academic or certification credentials.

ATTEMPTS AT CONSENSUS

Various state transition forums, as well as advocates for adult persons with more severe disabilities, in recent years have decried this trend and demanded more of evaluation in terms of practicality based on actual work situations. VECAP initiated a national committee on the topic of FVE, and attempted to draw out views leading to consensus by a special session at the 2006 Virginia Transition Forum; the session was attended by over 100 participants, but no consensus resulted. Two competing perspectives came into play, one from vocational rehabilitation where the focus was on vocational and work abilities; the other from special educators and adult caregivers whose focus was on independent living issues. It should be noted that the vocational rehabilitation focus overlaps with that of occupational therapists, who provide what is known as “functional capacity evaluation” with regard to work abilities. The current draft was further vetted by various participants at a session of the 2008 Virginia Transition Forum.

In the absence of clear guidance and consensus, several states have also put forth definitions and manuals related to the topic (cf, Washington State [The Center for Change, 2004]; Wisconsin [Kellogg, 1995]; Montana [Lehman, 2001]; Virginia [O’Leary & Collison, 2004]):

- Washington’s definition essentially describes a full comprehensive vocational evaluation and ties the findings to the student’s IEP.
- Wisconsin’s definition specifies the kinds of information that should result from FVE such as student preferences,

behavior, learning style, need for AT, physical/mental endurance, medical status, work skills, training methods.

- Montana's definition 1) suggests using existing functional information, 2) says FVE should be about job or career characteristics, and 3) is gathered via situational assessments in the setting where the job is performed.
- Virginia adopts parts of Montana's definition as above, and says the information can be gathered by observations, informal or formal measures, and should be "practical."

This position paper attempts to help address the need for clarity and for professional input in order to fulfill the regulatory requirement.

PROPOSED DEFINITION

-Functional Vocational Evaluation (FVE) is a systematic assessment process used to identify practical useable career and employment-related information about an individual.

-FVE incorporates multiple formal and informal assessment techniques to observe, describe, measure, and predict vocational potential.

-A distinctive feature in all FVE's is that FVE includes (and may emphasize) individualized experiential and performance-based opportunities, in natural vocational or work environments.

IMPORTANT CONTEXT FOR DEFINITION

As an organization, VECAP recognizes that the topic of FVE builds upon, and is intrinsically related to, an established pyramid of levels of assessment services:

- Level III at the top of the pyramid is the Comprehensive Vocational Evaluation/Career Assessment.
- Level II is a diagnostic and prognostic exploratory process, that moves on to the

third level only if more information is needed to make significant decision.

- Level I is to make quick decisions where minimal assessment is required.

FVE is most closely related to level III comprehensive vocational evaluation which is a comprehensive process with work as the focal point. This level is not necessary for all students, if reasonable and specific post secondary goals have been determined through Level 1 and 2 assessments. Level III is most appropriate for students 1) who would benefit from the "hands-on" experience afforded by work sampling, 2) who might typically be unsure of their career interests, 3) who may not have had opportunity to explore different careers and 4) who may need to showcase talents other than those limited to academic classes where they traditionally have been unsuccessful. The information from comprehensive vocational evaluations, and by extension FVE, is easily transferable to the Present Level of Performance of the I.E.P and to the Summary of Performance at exit from school.

EXPANSION OF DEFINITION

First, due to a somewhat disconnected body of knowledge and a blurring of terms in the varied literature, this paper uses the specific term "Functional Vocational Evaluation" (a.k.a. FVE) as addressing the requirement of IDEIA 2004; it also considers the term Functional Vocational Assessment as an over-arching concept in which FVE is a specific category. But the term Functional Assessment is considered a broad and general concept that may apply to a variety of other situations (e.g., academic, medical, pre-vocational, independent living, or leisure), will not be used as the equivalent of FVE, and practices mentioned in the literature on functional assessment may or may not be adopted for the current purpose.

Second, to further operationalize the proposed FVE definition, this position paper

agrees with, acknowledges, and repeats some of the concepts, tools and procedures set forth in several of the various sources cited earlier (Washington State, NICHCY 1990, Wisconsin, Montana, Virginia). Many of those statements are themselves reformulations of traditional vocational evaluation principles, and as they also overlap among the documents, will be assimilated here:

- FVE is a strategy, a framework, and a process for gathering and interpreting relevant information regarding a student's vocational potential and planning.
- FVE incorporates a systematic method of valid assessments, formal and informal, to collect, synthesize, and communicate student-centered information.
- The kinds of vocationally-relevant information collected includes student preferences, career interests, aptitudes and abilities, specific skills, personality factors such as temperament, values, attitudes, motivation, social skills and emotional intelligence; medical status, physical capacity and work tolerance; employability and work behaviors; learning style; need for assistive devices; employment-related reasonable accommodations; transportation; methods of training needed and Response-To-Intervention data; and analyses of work environments against students' worker characteristics.
- The FVE can include formal or commercial assessment; interviews, systematic observations and surveys; but a key element of "functionality" is the student involvement in real or simulated work and work environments that can include work sampling, situational assessments, job site visits, and community based (vocational) assessments, job try-outs, and job

analyses of real-life student outside employment and volunteer work.

- The goal of the FVE is to guide the development of the student's program in order to move the student from high school towards achieving their vocational potential in a post-high school setting.
- The FVE should be conducted and have results communicated within the context of the collaboration between the appropriate education team (of various designations in various states) and the post-secondary vocational team.
- Results should be reported in the IEP document and in the dynamically evolving Summary of Performance to measure and document student progress, to evaluate appropriateness of program resources, and match/place students in appropriate vocational/work placements.
- Results should be communicated with students to assist them to understand their strengths and limitations in terms of the job market and to make career decisions and with instructors, guidance counselors, employers and community service staff to provide necessary supports and adaptations for successful vocational experiences.
- FVE should be conducted by, or overseen by, trained professionals in the field of vocational evaluation, whose skill set specifically prepares them to take individual performance information and relate it to the world of work.

WHAT FVE IS NOT

Because changes in laws and regulations sometimes create a "bandwagon" effect with momentum carrying undesirable practices along with preferred practices, it may be important to add some cautions about what functional vocational evaluation is not.

First, it is not simply a narrative description of a set of actions, typical or otherwise, that a student performs, as an illustration of “functioning”. Illustration is not evaluation, and might not even be assessment.

Second, as assessment, FVE is not exempt from fundamental assumptions about assessment, such as listed in clearest fashion by early and later editions (1978, 1982, 1995) of Salvia & Ysseldyke’s handbook on Assessment (in Special and Remedial Education): Namely, that a) the assessor is skilled, b) error will be present, c) acculturation of comparison groups and target populations is comparable to students being assessed, d) behavior sampling is adequate, and e) present behaviors are observed but future behaviors are inferred. For example, regarding item (b), reliability is as essential for functional vocational evaluation as for any other type; what proof is there that a FVE today will give comparable results tomorrow, or by a different assessor? Those who produce and publish tools for functional vocational evaluations are not exempt from making readily available the technical information for consumers (e.g. vocational evaluators, educators, transition specialists), as recommended by the national guidelines for test publishers.

Third, regarding (d) and (e), FVE is not simply curriculum-based assessment, even if the curriculum now incorporates “career” information. The functional evaluation must be “vocation-ally relevant” (Brolin & Thomas, 1995).

Fourth, in contrast to comments from some quarters (for example, see Duffy, 1997), FVE should not be assumed to be less expensive, easier, or less time consuming than other assessments. As mentioned earlier, the trend had been towards shorter, more uniform and more psychometric assessments. But the quality of the FVE, the depth and

accuracy of information about the individual, and the link to meaningful work may be the determining factors as to the cost, time, or difficulty of conducting the evaluation.

OTHER CONSIDERATIONS TOWARDS FUNCTIONAL VOCATIONAL EVALUATION

This is not intended to be a guide to all the elements of how to conduct a FVE. There will be various ways to do that, according to the intentions and needs for a particular individual, the purposes of specific programs, and variations in local initiatives. But some things should be considered.

One: As noted in the proposed definition, a distinctive feature of FVE is the prominent role of individualized experiential opportunities in providing practical information about a student’s work performance and potential. How this meshes with other formal and informal parts of the evaluation partially depends on whether one presupposes a “match-to-fit” employment model, or a “fit-to-match” model. Both are being used currently, but with very different impacts. The former is more traditional; an individual’s employability characteristics (KSA’s, interests, personality style, etc) are matched as to how they fit known job openings and career path-ways. Most people (with and without disabilities) probably use a variant of this approach. But it underlies the trend of career testing, of matching to O*NET/DOT aptitude/physical demand/environmental feature categories of job analysis (also used by OT’s and PT’s in physical capacity evaluation), and with a variety of functional vocational assessment frameworks that have been published (see Brolin, 1995; Crewe, 1984; Gregg, 1996). It also underlies the expectations that students will meet the SCANS skill standards (1991) and Educating For the Future Standards (Stein, 2000).

However, some people with anomalous profiles (and persons with

significant disabilities often have this issue) do not fit neatly into pre-existing openings or pathways. Consequently functional vocational evaluations may presuppose a fit-to-match model to reveal how much these people fit desired situations, and then prescribe what work situation elements may have to be taught, accommodated, modified or eliminated in order to fit the person into a more-or-less match with a crafted employment position. This type of approach forms the framework for tools like the Transition-to-Work-Inventory (Friedman, et al, 1996) or the Goodness-of-Fit model by Wheeler (1996).

The closing list of frameworks has been ranged from the most comprehensive profile related to all employment without regard to the presence of disabilities to those profiles used for fitting persons with the most severe disabilities to match possible employment situations.

Two: Other current trends are not yet represented in functional vocational evaluation thinking, and should be. One is that the provision in IDEIA 2004 for Response To Intervention (RTI) as an assessment approach should also be considered as a potential FVE element. A typical RTI assessment incorporates graphs of evidence-based interventions and results on the functioning of students. This has vocational relevance not only for identifying the student's present learning behavior but for providing vocationally directed information that predicts how the student may need to address occupational training and workplace retention. A second trend is the IDEIA requirement for a Summary of Performance at school exit. Rather than an education-centered and jargon-filled document like the IEP to contain vocational information, the SOP is vocationally-centered and should contain FVE profile information useful to employers and post-secondary settings.

Three: Functional vocational evaluation should also increasingly incorporate a flexible and evolving body of information, a type of progressive career assessment, which would be the considered and documented set of career development interventions and exploration results over time – 2, 3. or 4 years, for example. This approach would also allow for more consideration of career development models such as the INCOME model (Beveridge, et al., 2002) that does not rest on a linear model of career development, and accounts for the impact of disability status (pre-career, mid-career, or episodic) on career development status.

It is not clearly evident what the framers of the language in IDEIA 2004 had in mind when they included “functional vocational evaluation” as part of their revision. It is also not predestined as to what the shape of regulations implementing FVE will. There are certainly other stakeholders who have a part in this discussion. But participants such as VECAP who have both interest and expertise in the matter wish to advance the proposition so that best practices take root while popular but less desirable practices do not supplant limited resources.

REFERENCES

- Beveridge, S, Craddock, S.H., Liesener, J., Stapeton, M., and Hershenson, D. (2002). “INCOME: A Framework for Conceptualizing the Career Development of Persons with Disabilities.” *Rehabilitation Counseling Bulletin*, 45:4, pp.195-206.
- Brolin, D.E., & Thomas, S.W. (1995) Functional/career assessment. In D.E. Brolin (Ed.), *Career Education: A functional life skills approach* (pp.39-61), Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Crewe, N., & Athelstan, G.T. (1984). *Functional Assessment Inventory Manual*. Copyright Univ. of Minnesota.

- Menomonie, Wisconsin: Materials Development Center, Stout Vocational Rehabilitation Institute, Univ. of Wisconsin-Stout.
- Dean, D., Ashley, J., Schmidt, R. & Rowe, K. (2006). The long-term impact of comprehensive vocational assessment for youth with disabilities in transition: evaluation of Virginia's Post-secondary Education/Rehabilitation Transition (PERT) Program. In *Vocational Evaluation and Career Assessment Professionals Journal*, Fall, 2(2), 14-32.
- Duffy, M.L. (1997). Reference Desk: Functional Assessment in Secondary Education: Connecting Formal and Informal Assessment. *Diagnostique* 22(4), 241-245.
- Friedman, L., Cameron, C.T., & Fletcher, J. M. (1996). *Transition-To-Work Inventory: A job placement system for workers with severe disabilities*. The Psychological Corporation. San Antonio: Harcourt Brace & Company.
- Gregg, N. and Curtis, R. (c 1996; published Spring 1997). *Learning Disabilities Functional Training Manual: A Guide to Assessment and Accommodations*. Learning Disabilities Research and Training Center, University of Georgia/Roosevelt Warm Springs Institute for Rehabilitation.
- Kellogg, Ann. (1995). *Vocational Experience Programs for Students with Disabilities, Revised*. Wisconsin State Department of Public Instruction, Madison, WI.
- Lehman, Martha (2001). "Transition IEP Agenda". Montana Office of Public Instruction, Helena, Montana.
- National Information Center for Children and Youth with Disabilities (NICHCY). Transition Summary #TS6, December 1990.
- O'Leary, Ed & Collison, Wendy. (2004). *Transition Services: Helping Educators, Parents, and Other Stakeholders Understand Postschool Outcomes, Courses of Study, and Coordinated Set of Activities*, in Transition Outcomes Project Manual, Virginia Department of Education, Richmond, VA.
- The Secretary's Commission on Achieving Necessary Skills (1991). *What work requires of schools; A SCANS report for America 2000*. Washington, D.C.: U.S. Department of Labor.
- Stein, S. (2000). *Equipped For the Future Content Standards: What adults need to know and be able to do in the 21st century*. Washington, D.C.: National Institute for Literacy.
- The Center for Change in Transition Services (2004). *Guide to Functional Vocational Evaluation in Washington State*. College of Education, Seattle University, Seattle, WA
- Wheeler, J.D. (1996). *Goodness of Fit: A guide to conducting and using functional vocational assessments*. Menomonie, Wisconsin: Stout Vocational Rehabilitation Institute, Univ. of Wisconsin-Stout.
- Woodford, C., & Modahl, T. (1999). A descriptive study of current practices in vocational evaluation. In *The Issues Papers: Ninth National Forum on Issues in Vocational Evaluation, Assessment and Work Adjustment* (pp. 137-151). Menomonie, WI: Stout Vocational Rehabilitation Institute, University of Wisconsin.

Comparisons of Frameworks in thinking about Functional Vocational Evaluation

Samuel Castiglione, D.Ed.

Spring 2006, revised 5/08

Traditional – DOT Factors:	Traditional VR Categories:	SCANS Skills:	Equipped For the Future (EFF) Standards
<i>GED Factors-</i> Reasoning Math Language	Mobility	Foundation Skills: Academics- Reading Listening Math Writing	(NIFL, 3 rd ed. July 2001) ----- <i>Communication</i> >Read with understanding. >Convey ideas in writing. >Speak so others can understand. >Listen actively. >Observe critically
<i>Specific Aptitudes</i> General Learning Verbal Numerical Visual-Spatial Form Perception Clerical Perceptn. Motor Coordina. Finger Dexterity Hand Dexterity Eye-Hand-Foot Coordination Color Discrimin.	Communication Self Care Self Direction Interpersonal Skills Work Tolerance	Thinking skills Personal qualities Job Specific skills: Using resources Working with others	<i>Decision-making</i> >Solve problems & make decisions. >Plan >Use math to solve problems & communicate.
Strength-S,L,M,H Climbing Balancing Stooping Kneeling Crouching Crawling Reaching Handling Fingering Feeling Talking Hearing Tasting/smelling Near Acuity Far Acuity Depth Perception Accommodation Color vision Field of Vision	Work Skills	Acquiring information Understanding systems Using technology	<i>Interpersonal</i> >Cooperate with others. >Guide others. >Advocate and Influence. >Resolve conflict and Negotiate. <i>Lifelong Learning</i> >Take responsibility for learning. >Learn through research. >Reflect and Evaluate. >Use Information & Communication Technology.
Weather exposure Extreme heat/cold Noise Intensity Moving machines Fumes, chemicals			

LD Functional Training

Manual: A Guide to Assessment & Accommodation

Learning Styles Checklist- Broad Reasoning Holistic thinking Verbal problem Solving Sequential thinking , Non verbal problem solving

Cognitive: Memory, Perception, Motor, Attention/Focus, Processing speed

Oral Language: Phonology, Understanding language, Word finding, Sentences, Pragmatics.

Areas Affected: Job/task mgmt., Time mgmt., Reading-decoding or comprehension Math-calculation, applied prob. Solving. Written Exp. Mechanics, Organizing ideas. Handwriting/ Keyboarding.

Social/ Emotional

LDR&TC, Univ of GA Gregg, Curtis, et al. 1996

INCOME: Career Develop. Framework f/ Persons w/ Disabilities

Statuses:

Imagining

iNforming

Choosing

Obtaining

Maintaining

Exiting

3 subgroups each status:

Onset of Dis. Pre-career Mid-career Episodic

Beveridge, Craddock, Liesener, Stapleton, Hershenson.

RCB 45:4 pp. 195-206 (2002)

FAI Manual Crewe & Athlestan, 1984 *Areas of Possible Functional Limitations*

1. Learning ability
2. Ability to read & write in English
3. Memory
4. Spatial & Form perception
5. Vision
6. Hearing
7. Speech
8. Language Functioning
9. Upper Extremity Function
10. Hand Functioning
11. Motor Speed
12. Ambulation or Mobility
13. Capacity for Exertion
14. Endurance
15. Loss of Time from Work
16. Stability of Condition
17. Work History
18. Acceptability to Employers
19. Personal Attractiveness
20. Skills
21. Economic Disincentives
22. Access to job Opportunities
23. Requirement for Special Work Conditions
24. Work Habits
25. Social Support System

26. Accurate Perception of Capabilities & Limitations
27. Effective Interaction with Employers/co-workers
28. Judgment
29. Congruence of Behavior with Rehabilitation Goals
30. Initiative and Problem Solving Ability
- Possible Strength Items*
31. Unusually attractive personal appearance
32. Exceptionally pleasing personality
33. Extremely bright or verbally fluent
34. Has vocational skill in great demand
35. Excellent educational credentials
36. Highly supportive family
37. Sufficient personal financial resources
38. Extremely motivated to succeed
39. Job available w/ previous or current employer.

Transition To Work Inventory model: “Fit to Match” <i>Job Analysis, Worker Analysis</i>	Decision Making/ Reasoning	Goodness of Fit: FVA model, Jill Wheeler, PhD <u>Stout, 1996</u>	11. Medical/ physical status
	Social Interaction	<i>A. Individual’s assessment</i>	12. Orientation/ Mobility skills
Grasping/holding	Oral Comprehension		13. Fine/Gross motor coordinatn.
Releasing items	Figure-ground Discrimination	1. Indiv. Prefer.	14. Work Related skills/ concerns
Applying pressure to items	Estimating spatial relations	2. Indiv. Strengths	15. Transportation needs
Fine Motor Dexterity	Working under distractions	3. Work History	16. Current financial
Fine Muscle control	Equipment/ safety	4. Functional Use of academics	Information/ concerns
Muscle strength	Balance	5. Following directions	17. Special considerat./needs
Touch Sensitivity		6. Behavior	18. Recommendati ons.
Work Pace		7. Learning style	(Note philosoph. comparison to TWI)
		8. Social skills/ Interactions	
		9. Communication skills	
		10. Work endurance/ stamina	

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Professional members shall be those individuals actively engaged in the practice of some aspect of vocational evaluation or work adjustment training. This shall include those individuals who are immediate supervisors, teachers, or researchers in the fields of vocational evaluation or work adjustment.

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Newsletters, Journals, discounted registration at Forum and other training events, one member/one vote voting privileges, eligible to hold office in VECAP

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Professional (\$130) – 2 years Associate (\$130) – 2 years

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