

The Vocational and Rehabilitation Assessment Model (VRAM): Introduction of an Empirically Derived Model of Forensic Vocational and Rehabilitation Assessment

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The current state of forensic vocational and rehabilitation assessment is discussed. The authors pay particular attention to research targeted at addressing the problematic issue of highly disparate and seemingly incongruent expert opinions of vocational earning capacity derived from a common fact pattern. An overview of the current and historical models of earning capacity assessment is provided, along with an assessment of the strengths and weakness of the models. Research results stemming from an examination of core variables in forensic earning capacity assessment is introduced. In addition to a set of core variables, the study also yielded a set of 29 domain level groupings of variables. Domain level groupings were organized into the Vocational and Rehabilitation Assessment Model (VRAM). The VRAM model is an empirically derived model for use in forensic vocational and rehabilitation assessment applications. The manuscript concludes with a discussion the VRAM model components and the key assessment issues relevant to each domain within the model.

Keywords: forensic, earning capacity, vocational assessment, rehabilitation assessment, model

Assessment of disability as it relates to vocational functioning involves the evaluation of multiple domains of endogenous and exogenous variables. Individual, social, economic, and political influences amalgamate to form the unique vocational and human capital profile an individual presents to an employer in consideration for work opportunity. Since inception of the vocational rehabilitation profession, substantial literature contributions have been made to describe factors and issues relevant to determining a person's vocational potential and earning capacity. Farnsworth et al. (2005) wrote that the process of vocational evaluation draws upon clinical skills from the fields of psychology, counseling, and education. Specific skills include file review, diagnostic interviewing, psychometric testing, clinical observation, data interpretation, and career counseling. These skills, when employed within the vocational rehabilitation process, are important to evaluating a person's skills, abilities, and capacity to perform work activity for

which the person is either qualified or may be able to become qualified (Owings, Lewis, Streby, & Hildebrand, 2007). This vocational rehabilitation process and evaluation framework has given way to the vocational rehabilitation counselor's contemporary role as the generally accepted expert in vocational earning capacity assessment (Owings, Lewis, Streby, & Hildebrand, 2007).

In many litigated settings, the end result is a determination of injuries or damages sustained by a claimant or plaintiff (Neulicht & Constantini, 2002). Often, economic damages caused by a loss or reduction in a person's ability to earn wages or a salary can be significant and represent a large proportion of the total damages sought to be recovered (Cohen & Yankowski, 1998). In most courts of law, damages from lost wages due to an injury or death are measured by an earning capacity standard rather than an actual or expected earnings standard (Horner & Slesnick, 1999).

An actual earning standard would only acknowledge the historical earning record of a person and would not be prospective. According to Horner and Slesnick (1999), actual earnings are best conceptualized as a "series of outcomes of a complex stochastic process involving the interaction of a person's abilities and preferences with the needs of employers" (p. 14). An expected earnings standard is simply "a series of earning figures, which are the expected values of actual earnings in the corresponding time periods" (p. 14) (Horner & Slesnick, 1999). Expected earnings rely on a more mathematical solution and, therefore, are not directly observable. Because of the mathematical foundation of this construct, it does not account for changes in future earnings that are influenced by the unique vocational factors of the individual - namely the individual's abilities, available work opportunities, and the individual's vocational orientation toward future work. Reliance on a person's past vocational decisions to project future vocational course can be flawed, particularly in cases involving injury or a reduction in functional capacity for future work. Using an earning capacity standard, the expert's opinions consider expected earnings of a worker who chooses to maximize his or her actual earnings. Therefore, earning capacity is not normally affected by voluntary choices made by a worker regardless of whether he or she chooses to exercise his or her inherent abilities. Because of the importance that earning capacity plays in the calculation of damages, the ability to reliably predict a person's future earning capacity is crucial.

Despite numerous methods and protocols published in peer reviewed journals and textbooks (Andrew, 2004; Cohen & Yankowski, 1998; Drummond, 1996; Drummond & Ryan, 1995; Field, 1993; Havranek, 2007; Havranek, Field, & Grimes, 2001; Power, 2006; Roessler & Rubin, 2006; Rubin & Roessler, 2008; Sawyer, 2002; Shahnasarian, 2004a; Wattenbarger & McCroskey, 2004; Weed & Field, 2001), there remains a high level of variability in the final evaluation product of vocational rehabilitation consultants. In particular, the variability appears to be in the underlying foundation of variables considered in arriving at vocational conclusions.

In an investigation of attorney opinions of vocational rehabilitation consultant methodologies, Shahnasarian and Lassiter (2002) found attorneys have little confidence in the objectivity or consistency of methods used by forensic vocational rehabilitation consultants. In a study of variables considered by vocational consultants in preparing vocational reports, Robinson, Young, & Pomeranz (2009), identified a high degree of variability in variables documented by consultants in preparing reports outlining his or her expert conclusions. In a qualitative content analysis of 30 vocational rehabilitation reports across a range of venues, the authors identified 234 unique variables, but only 22 were found to occur in greater than 50% of the reports. This suggests a low

level of methodological reliability in terms of variables documented by vocational consultants across evaluation settings.

The study by Robinson et al. (2009) demonstrated a need for research to clarify core variables to be considered by rehabilitation consultants in developing opinions of vocational earning capacity. By identifying core variables, progress may be made towards contracting the degree of variability in opinions, thus improving reliability and defensibility. Variability in opinion and methodology is particularly problematic in legal-forensic settings where vocational consultants retained by opposing parties routinely evaluate the same data and apply peer-reviewed methods, yet arrive at incongruent or contradictory opinions. Grimes suggested a lack of consensus about the theory of earning capacity may be related to the application of rehabilitation theory in adversarial settings where parties have competing interests. In a recent literature review by Shahnasarian (2008), a paucity of empirically-based research related to earning capacity assessment was identified. Shahnasarian opined a more highly evolved literature base would help control the issue of incongruent expert opinions derived from a common fact pattern.

Review of Vocational Earning Capacity Models

A comprehensive literature review of models of vocational earning capacity was completed. The authors found that much of the literature written on models of vocational earning capacity comes from the disciplines of vocational rehabilitation and economics. A summary review of the models identified in the literature review follows.

RAPEL

RAPEL is an acronym that describes five domains of analysis relevant to vocational capacity and rehabilitation analysis. The domains include the rehabilitation plan; access to the labor market; placeability; earning capacity, and labor force participation. While generally described in the literature as a "method" versus a model, RAPEL offers little guidance with respect to a methodological approach. Field (2008) described RAPEL as one of the most comprehensive methods (models) as it considers resources and strategies from a variety of sources. In conceptualizing RAPEL, Weed and Field (2001) described the model as a "comprehensive approach which includes all elements needed to determine loss of access, loss of earnings capacity, future medical care, work life expectancy, rehabilitation plan, placeability, and employability factors" (p. 246).

The rehabilitation plan component within RAPEL considers an evaluatee's vocational and functional limi-

tations, strengths, emotional functioning and cognitive capabilities (Weed & Field, 2001). This component details the plan for establishing or increasing employment potential through training or accommodation, as well as future life care needs through the development of a life care plan (Weed & Field, 2001).

The access to the labor market component within RAPEL considers issues related to the evaluatee's access to vocational choices or opportunities both before and following an injury (Weed & Field, 2001). Access to the labor market is determined through any number of sub-methodologies such as transferability of skills analysis, disability statistics, and professional experience.

Placeability within RAPEL represents the likelihood of an evaluatee being successfully placed into an actual job (Weed & Field, 2001). They describe a person's placeability as the point "where the rubber meets the road." Considerations for determining placeability include impairment specific employment statistics; the economic situation within a community, and the availability of jobs within a specific occupation. Consideration of placeability also includes factors specific to the evaluatee such as attitude and personality.

Earning capacity within the RAPEL model is a function of the previously discussed rehabilitation plan, access to the labor market, and a person's placeability profile (Weed & Field, 2001). They define earning capacity within this model as being based upon earnings paid to an individual for positions they can reasonably attain and hold. Earning capacity within this model can be operationalized through a number of methods such as categorizing jobs similar to the evaluatee's parents and siblings (pediatric cases); ability to be educated or trained; computer generated information; and an assessment of an evaluatee's potential based upon their unique worker traits.

Labor force participation within RAPEL addresses the conceptual issue of work life expectancy. This component of RAPEL attempts to determine the degree of reduction in expected work participation resulting from impairment. Issues relevant to a reduced work life expectancy include longer periods of unemployment between jobs, part time work vs. full time work, and lost work opportunity as a result of medical treatment follow up or earlier retirement age (Weed & Field, 2001).

The RAPEL model is clearly the most widely referenced vocational rehabilitation model of earning capacity analysis (Barros-Bailey & Neulicht, 2005; Berens & Weed, 2010; Field, Johnson, Schmidt, & Van de Bittner, 2006; Field & Weed, 2002; Stokes & Maestri, 2001; Weed & Field, 2001). The model has strong face and content validity within the vocational rehabilitation community, based upon its breadth of publication. The RAPEL model purports to be a comprehensive model that addresses a wide range of fac-

tors and variables. Within the domains of the RAPEL mnemonic is tremendous flexibility for consideration of various factors and variables relevant to the topic of vocational earning capacity assessment. RAPEL relies upon sub-methods and protocols of the professional's choice to address the various domains within the RAPEL framework. This high level of flexibility has the potential to compromise the reliability of the model. The principle question then becomes, can multiple consultants using the same fact pattern utilize the RAPEL model to arrive at reasonably consistent opinions. Empirical evidence of the RAPEL method's validity or reliability has not been reported.

Shahnasarian Model/Method

Shahnasarian (2001, 2004a, 2004b) described a method for synthesizing relevant case data and collateral source information. In sequential order, the method involves a review of existing records followed by an examination of the subject and subsequent formulation of opinions. Shahnasarian described the subject examination as involving three distinct components. First is the clinical interview and psychometric testing which focuses the examination on:

- background information;
- chronology of vocational activity near an event in dispute;
- potential physical problems or psychological problems that may affect career development;
- activities of daily living;
- mental health;
- education and special training;
- career development; and
- administration of standardized tests.

Following the clinical interview and testing, the consultant initiates labor market and associated research to address questions and hypotheses derived from the previous step (Shahnasarian, 2004a). In select cases, Shahnasarian (2004a) proposed consulting with collateral sources of information such as other experts, family members, caregivers, employers, and case managers. This method culminates in completion of the ECAF2, which is an instrument intended to "facilitate the systematic analysis and appraisal of loss of earning capacity" (p. 3).

The ECAF2 instrument describes 14 factors to be considered in analyzing a person's future career development and earning capacity (Shahnasarian, 2004c; 2009a; 2010b). The 14 factors are further organized into drivers and inhibitors. Driver factors are considered facilitative of higher earning capacity, while inhibitor factors tend to be detrimental to future earning capacity. Driver factors include stability of career

development, work propensity, demonstrated earning history, career motivation, and cognition. Inhibitor factors include phase of career development, subject specific issues, ability to apply prior skills, future career development prospects, prognosis, need and capacity for retraining, preexisting vocational handicaps, acquired vocational handicaps and vocational adjustment issues.

Since introduction of the ECAF (Shahnasarian, 2004c), the instrument has been subjected to a randomized study of its efficacy (Shahnasarian, 2004d). The ECAF has also been subjected to a factor analysis of its 14 factors (Shahnasarian & Leitten, 2006). A study of the methodological reliability of the ECAF found test-retest reliability coefficients ranging from .85 to .97 ($p < .01$) (Shahnasarian & Leitten, 2008). The focus of the Shahnasarian model appears to be aimed at satisfying the evidentiary requirements set forth in the Federal Rules of Evidence, rule 702 (U.S. House of Representatives, 2009). The model is flexible across venues and professional orientations, as it does not rigidly define the underlying protocols to be employed by the professional in reaching a conclusion.

The ECAF also includes an Impairment to Earning Capacity Rating Scale (Shahnasarian, 2004d). This scale ranges from zero to 100 with qualitatively derived anchor points defined as mild (1-20%); moderate (21-50%); severe (51-80%); and extremely severe (81-99%) (Shahnasarian, 2009b). An exploratory study to establish ECAF cut-off scores for the rating scale found that mechanical application of a formula or rating scale for earning capacity assessment was impractical (Shahnasarian, 2009b).

Although the Shahnasarian model purports to include economic considerations in the model structure, such considerations are not clearly evident when translated into the ECAF2 application framework. While the model is robust with economic supply side factors (factors attributed to the individual), there is no obvious consideration given to macroeconomic demand side factors. Macroeconomic demand side factors would include considerations such as unemployment, employer hiring requirements and geographic location. The model gives consideration to future career development prospects, but this appears to limit the scope of inquiry to industry specific change and innovation from a micro-economic perspective.

Deutsch/Sawyer Model

One of the earliest models of earning capacity assessment was presented in the pioneering vocational rehabilitation work of Deutsch and Sawyer (1986). The early Deutsch/Sawyer model considered five domains within the earning capacity model that included work identity of vocational goal, establishment within the vocational goal, skill and ability development to achieve proficiency within the vocational goal, experi-

ence within the vocational goal, and the degree of difference between historical (earned wages) and the average earnings for most workers within the alternative vocational goal. Within the model, foundational factors were also considered such as the evaluatee's education, intellectual development, academic development, work history and transferable skills. Deutsch and Sawyer were among the earliest vocational theorists to differentiate between the concept of actual earnings and earning capacity. The measurement of a person's pre-injury and post-injury earnings are not necessarily reflective of a person's maximum ability to earn money- instead, earning capacity is reflected as a person's post-accident earning capacity or the potential a person has to earn wages.

Field (2008) critiqued the Deutsch/Sawyer model as being non-specific and global in nature. One of Field's critiques of the Deutsch/Sawyer model is that it offers no methodological recommendations to evaluate the many variables considered and therefore requires significant professional judgment to arrive at an opinion of earning capacity. The Deutsch/Sawyer model relies upon sub-methods and protocols which provide significant flexibility within the model, but, like RAPEL, this has the potential to compromise the model's reliability. Like RAPEL, the principle question is whether two or more consultants using a common fact pattern can apply the model and arrive at reasonably consistent opinions? No empirical validation studies were identified for the Deutsch/Sawyer model. Accordingly, its utility as a model rests upon its face validity.

Labor Market Access Model

The Labor Market Access (LMA) model was first introduced in 1981 (Weed & Field, 1994) and focuses on the importance of analyzing lost wages within the context of labor market conditions (Weed & Field, 2001). The underlying assumption in the LMA model is that it is possible to determine the extent of a person's vocational disability as a function of calculating a percentage loss of access to jobs within the geography of the person being evaluated (Field, 2008). The percentage loss of the labor market then becomes a function of comparing pre-injury and post-injury medical-vocational profiles.

The LMA model is dependent upon national government employment and wage statistics. The principle occupational data source used in LMA, the Dictionary of Occupational Titles (DOT) (U.S. Department of Labor, 1991), has been discontinued by the publisher and has not been updated since 1991. Accordingly, government statistics are no longer tied directly to DOT specific data. Estimates of specific employment numbers can only be roughly estimated through the application of imprecise crosswalks between the for-

mer DOT and the current data that is based upon standard occupational classification (SOC) codes.

Dillman's Loss of Earning Capacity Model

Dillman's loss of earning capacity model was first proposed in 1987 (Hankins, 2009). This model considers earning capacity to be a mathematical function of four variables that interact. Mathematically, this model is expressed as Impairment to Earning Capacity = $f(L, P, T, C)$ where "L" represents reduction in labor market access; "P" represents reduction in average pay for residual jobs; "T" represents reduction in work life or hours available for work; and "C" represents reduction in the ability to compete in the open labor market. This model is best described as a mathematical model that does not involve assessment of specific jobs a plaintiff may be able to do post injury, but instead assigns values to each of the variables to arrive at a percentage of vocational earning capacity loss (Dillman, 1998). No empirical validity or reliability studies of Dillman's model were identified in the literature.

McCroskey Vocational Quotient System (MVQS)

The MVQS is a system of computer programs that is represented as an "unparalleled approach to matching people with their best job choices" (p. 1) (Wattenbarger & McCroskey, 2004). The MVQS analysis output consists of a list of jobs that are reasonably available in a specific labor market that are also consistent with an evaluatee's unique worker trait profile. The MVQS job-person matching methodology is based on the Minnesota Theory of Work Adjustment described by Dawis, Lofquist, and England (1964) and Dawis, Lofquist, and Weiss (1968). The job-person matching process involves comparing the 24 most salient worker traits for a particular individual to the worker traits for each of 12,975 jobs in the application's database of jobs. With the list of jobs generated, the program is purportedly able to determine "labor market access, assess training and skill development needs, give counsel regarding vocational choice, estimate transferable skills, predict starting wages and future earnings, quantify disability and lost wages" (p. 2) (Wattenbarger & McCroskey, 2004). To make these computations, the program utilizes a feature unique to the MVQS in that each job identified is assigned a unique vocational quotient (VQ) derived primarily from statistical manipulation of the 24 most salient worker traits for each job.

Each job in the program's database is assigned a VQ. The larger the VQ for a particular job, the greater the job difficulty or demand placed upon a worker (Wattenbarger & McCroskey, 2004). Multiple studies have demonstrated the MVQS and VQ to have good validity and reliability in job prediction and estima-

tion of earning capacity (McCroskey, 1992; McCroskey & Hahn, 1995; McCroskey and Hahn, 1998).

Rehabilitation Case Analysis Method (RECAM)

The Rehabilitation Case Analysis Method (RECAM) was first conceptualized by Sawyer (October, 2002) as a training tool that operationalized specific steps in vocationally analyzing a rehabilitation case. RECAM is comprised of six categories or domains of data that are sequentially analyzed to arrive at an expert vocational and rehabilitation opinion. The six broad RECAM functions include

- case referral and acceptance;
- initial case review;
- client interview and rehabilitation evaluation;
- case analysis and plan;
- report and recommendations; and
- case update.

Barros-Bailey and Neulicht (2005) described RECAM as being in its infancy. Since introduction in 2002, no additional information was identified in the literature describing the method's validity, reliability, or application.

Economic Foundations of Earning Capacity Assessment

According to Dillman (2009), economists view an individual in terms of human capital. Human capital is best described as the sum total of an individual's education, training, and intrinsic abilities presented to potential employers for labor consideration in exchange for wages. Dillman described two generally accepted economic variables that serve to moderate a person's earnings over time. These variables include general structural wage increases and the "age earnings cycle". Dillman (1988) defined general structural wage increases as those that are affected by the entire economy. Operationally, general wage increases may be viewed as "inflationary" wage gains.

The age-earning cycle is an economic concept that states that one's earnings are largely dependent upon one's age (Dillman, 1988). The typical wage earner will enter the labor market at a relatively low wage, rapidly progress in earning over his or her younger years, only to level off during mid-life. In some cases, wages will begin to decline as one nears the end of their work life expectancy. A flattening of the age-earning cycle then reflects a lessening of work opportunity over time. Further, a flattening of the age earning cycle may also suggest the typical learning curve of a job has peaked resulting in the realization of full wage earning "potential". Theoretically, absent

additional human capital investments, future wage increases will strictly be structural in nature.

The fundamental economic concepts of supply and demand are key influences upon the age-earning cycle. According to Horner and Slesnick (1999), supply side variables addresses what a person is able and willing to do for a given wage rate. A person's physical, emotional, and cognitive abilities determine the individual's work capacities within a given labor market. What a person is willing to do for a certain rate of pay is a function of his or her individual preferences. Horner and Slesnick described how personal preference in vocational selection has the potential to confound the concept of future earning capacity when the path chosen does not maximize income potential. Therefore, observations based solely upon a person's past vocational choices may not be reflective of their earning capacity given the person's unique vocational profile. Employees have the capacity to exercise individual choice based upon preferences that will subsequently impact their earning capacity. A person's expected earnings then are altered as the individual exercises individual choice in response to opportunities and preferences. Choices the individual makes with respect to occupational selection, will directly increase or decrease expected earnings, but has no impact on earning capacity which assumes individuals will make choices that maximize his or her earning potential.

Demand side economic variables are concerned with the probability of a person actually obtaining a specific job at a given wage rate within a particular labor market. Demand side variables are related directly to the question of whether an economic projection of future earnings has a reliable foundation, or is instead, based merely upon vocational possibilities and speculation (Horner & Slesnick, 1999). Demand side characteristics focus on the number of jobs with employers for a specified level of functional capacity at various wage levels. According to Horner and Slesnick, a vocational consultant who ignores the demand side characteristics is in essence not performing an earning capacity evaluation, but is instead, performing a vocational capacity evaluation.

Core Forensic Vocational Earning Capacity Assessment Domains

In a study by Robinson (2011), 29 construct domains considered core to the assessment of vocational earning capacity in a legal-forensic setting were identified through a three round Delphi consensus building study. Prior to initiating the study, Robinson, Pomeranz, and Moorhouse (2011) completed a literature review and found the Delphi method to be well suited for forensic rehabilitation research. The Delphi method's principle strength is the ability to extract variables or ideas from a diverse group of experts where consensus does not exist. The method allowed

for qualitative expert input to be refined into a set of core construct domains and variables based on pure expert input that was untainted by social pressure or authority figures within the Delphi expert panel. Forty-seven expert panelists contributed construct domain level data with each meeting the following minimal study inclusion criteria:

- Each panelist held at least one nationally recognized vocational rehabilitation credential as a Certified Rehabilitation Counselor; Certified Vocational Evaluator; or held Diplomate or Fellow status with the American Board of Vocational Experts.
- Each panelist had completed at least five evaluations involving the assessment of vocational earning capacity in a legal-forensic setting.
- Each panelist had been accepted at least one time as a qualified expert on the issue of vocational earning capacity by a trier of fact before a civil or administrative court within the United States.
- Each panelist had been actively involved in the field of vocational rehabilitation within the preceding 12 months.

In soliciting construct domain level data, panelists were asked to think of a particularly complex case in which he or she (as the vocational rehabilitation expert) had been retained to assess an evaluatee's vocational earning capacity. With this case in mind, panelists were requested to record all domains of variables believed to be essential to the evaluation. Expert input was analyzed using NVivo© (2008) qualitative data analysis software. NVivo© provided the researcher with a dynamic yet consistent method for coding individual data nodes. Each data node represented a single qualitative data element. Data nodes were then synthesized by combining like terms and ideas to derive one universal description of each domain and variable described by panelists.

Twenty-nine unique construct domains were identified in the Delphi study (Table 1). The majority of these domains were conceptually similar to those described in the general vocational rehabilitation literature (Andrew, 2004; Cohen & Yankowski, 1998; Dillman, 1987; Drummond, 1996; Drummond & Ryan, 1995; Field, 1993; Havranek, 2007; Havranek, Field, & Grimes, 2001; Power, 2006; Roessler & Rubin, 2006; Rubin & Roessler, 2008; Sawyer, 2002; Shahnasarian, 2004a; Wattenbarger & McCroskey, 2004; Weed & Field, 2001; Williams, Dunn, Bast, & Giesen, 2006). The high level of construct domain consistency between the Delphi study and domains described in the general rehabilitation literature emphasize the congruency between the fields of forensic rehabilitation counseling and non-forensic rehabilitation counseling. This high level of congruency is most likely due to the fact that forensic rehabilitation counseling has its roots in the

Table 1
Core Domains in the Assessment of Vocational Earning Capacity

Domain Name	Domain Operational Definition
Activities of Daily Living	Variables addressing self-care issues and assistance received either through personal care services or assistive devices and equipment
Avocational Activities	Variables related to hobbies and recreational pursuits
Behavioral Health	Variables that describe the behavioral relationship between the individual and his or her immediate and extended social environment(s)
Cultural	Variables that describe the behaviors and beliefs characteristic of a particular social, ethnic or other group
Economic	Variables that address a person's current and historical personal income and resources
Education-Compulsory (k-12)	Variables that address a person's education from kindergarten through the 12 th grade
Education-Higher Education (college)	Variables related to a person's college level instruction
Education-Vocational and Apprenticeship	Variables that address a person's training through formal vocational instruction or apprenticeship training
Education-General Variables	Variables related to a person's educational development that are not clearly categorized into other educational categories
Financial	Variables that address the financial health, status and stability of the evaluatee
Household Activities	Variables that address the evaluatee's participation in household activities
Job Acquisition and Maintenance	Variables that address issues related to obtaining and maintaining work
Labor Market Sampling Information	Variables related to employer derived data intended to obtain an understanding of a specific job or group of jobs
Labor Market Statistical Information	Variables related to sources of statistical data intended to obtain an understanding of specific labor market information
Language Skills	Variables that address language skills
Legal Jurisdiction	Variables that address aspects of a matter specific to the venue or jurisdiction within which a matter is administered or tried
Medical-Functional Capacity	Variables that address a person's residual functional capacity for activity and function
Medical-History and Treatment	Variables related to a person's past medical history and current treatment
Military Service Experience	Variables related to a person's military service experience
Past Work Experience-Variables Specific to the Employee	Variables that describe employee characteristics of each individual job a person has held during his or her work history
Past Work Experience-Variables Specific to the Employer	Variables that describe employer characteristics of each individual job a person has held during his or her past work history

Table 1 (Continued)
Core Domains in the Assessment of Vocational Earning Capacity

Domain Name	Domain Operational Definition
Past Work Experience-Variables Specific to the Job	Variables that describe characteristics of each individual job a person has held during his or her past work history
Professional Resources	Includes resources referenced by panel experts in rendering opinions of vocational earning capacity
Psychometric Measurement	Variables that address psychometric measurement of function
Rehabilitation Planning & Services	Variables that describe rehabilitation planning and services provided or planned for the evaluatee
Socioeconomic	Variables that address individual, social and economic factors that are specific to the evaluatee
Transferable Skills	Variables that address skills transferable from one type of work to another without significant effort on the part of the individual or employer
Transportation	Variables that address transportation related skills and barriers
Work Life Participation	Variables that address the expected duration or reduction in how long a person may participate in the world of work

Note. N=29

early vocational rehabilitation movement (Owings, Lewis, Streby, & Hildebrand, 2007). Despite the high level of consistency between variables applicable to both forensic and non-forensic settings, three of the 29 domains of variables were unique to the forensic rehabilitation assessment venue. Unique forensic rehabilitation assessment variables included economic variables, work life participation variables, and legal jurisdiction variables.

Vocational and Rehabilitation Assessment Model

The Vocational and Rehabilitation Assessment Model (VRAM) (Figure 1) is an empirically derived structural model of vocational and rehabilitation assessment in a legal forensic setting. The structured presentation of VRAM is useful for visualizing the relationship and interaction of construct domains. The model is divided into three distinct operational modules: records review and rehabilitation interview (labor supply); labor market research and inquiry (labor demand); rehabilitation analysis and opinion formulation

Records Review and Rehabilitation Interview

The records review and rehabilitation interview are, in most cases, requisite first steps in conducting a vocational and/or rehabilitation assessment. Conceptually,

at this step in the assessment process, the rehabilitation consultant is focused on identifying the multitude of evaluatee specific variables expected to inhibit or facilitate present and future vocational and rehabilitation potential. This analytical review of existing evidence and rehabilitation interview findings are central to formulating a working hypothesis for further case specific research, analysis and hypothesis testing. The working hypothesis then becomes the operational expression of economic supply side considerations specific to the evaluatee. Core domains to be considered in the evaluatee specific supply side analysis include:

- Cultural considerations
- Educational experiences
- Language skills
- Socio-economic considerations
- Avocational activities
- Activities of daily living
- Household activities
- Behavioral health
- Past and present medical treatment
- Medical functional capacity
- Economic & earning history

- Current financial resources
- Military service experience
- Job acquisition and maintenance skills
- Past work experience
- Transportation resources

Labor Market Research and Inquiry

The labor market research and inquiry module provides ecological validity to expert opinions of vocational capacity. This module involves joint analysis of pertinent labor market and other economic statistics and local labor market sampling. Jointly, these construct domains yield the necessary data to evaluate the vocational employability and placeability of an evaluatee.

Rehabilitation Analysis and Opinion Formulation

The rehabilitation analysis and opinion formulation module involves application of established rehabilitation methods and protocols that, along with the other two modules, contribute to development of expert rehabilitation opinions. Specific analysis performed require professional judgment be applied at this juncture to address referral questions specific to the case being evaluated. Core analyses in this module may include any or all of the following:

Psychometric Measurement. A core component of this module involves psychometric assessment of the evaluatee. Psychometric measurement of various worker traits provides key data for analyzing rehabilitation need and employment potential. Psychometric assessment instruments are evaluatee specific and require professional judgment to ensure appropriate instrument selection. The most common types of psychometric instruments administered at this stage include measures of intelligence, educational achievement, aptitudes, interests, personality, and temperament. Appropriate and accurate assessment at this stage is key to developing a residual vocational and rehabilitation profile that is subsequently considered in analyzing transferable skills to other work and issues of vocational employability and placeability.

Future Medical Care Needs. A second core component of this module is assessment of future medical care needs. In matters where the rehabilitation consultant has been retained to develop a life care plan, it is here where future care needs are evaluated. Apart from development of a life care plan, the time, frequency and duration involved in an evaluatee's future medical care have a direct impact on both formulation of a rehabilitation plan and upon an evaluatee's vocational employability and placeability within the labor market. Generally speaking, the more intensive fu-

ture care needs are, the greater the impact upon a person's ability to sustain and maintain competitive employment.

Transferable Skills Analysis. Power (2006) described three different types of skills that include adaptive, functional and content skills. Adaptive skills are related to individual self-management and personality traits (Power, 2006). Functional skills are individual behaviors or abilities related to interaction with data, people, and things within a work environment or context. Content skills are best described as competencies a person has that are directly related to performance of a specific job or cluster of jobs. In cases where an evaluatee cannot return to his or her previous work due to reduced functional capacity, identification of suitable jobs within the person's functional skill level is necessary. If applicable, identification of an evaluatee's pre-injury skills is a requisite step to identifying alternative jobs.

Employability and placeability. The concepts of vocational employability and placeability are core elements in every assessment of vocational capacity. Employability addresses the issue of whether an evaluatee is ready for work. Central employability issues involve selection of appropriate vocational goals that consider the evaluatees vocational readiness characteristics such as aptitudes, personality, temperament, and residual functional capacity. While employability addresses work readiness issues, placeability addresses the question of whether an individual meets the hiring requirements of actual employers within a specific geographical labor market. While a job may exist within a particular labor market, if the evaluatee in question would not be a reasonable candidate for employment consideration, then the suitability of the job as a vocational goal must be questioned. To be considered a viable work opportunity, the concepts of vocational employability and placeability must be demonstrated.

Wage Earning Capacity. Damages caused by a loss or reduction in a person's ability to earn wages, can represent a large proportion of the total damages in a legal claim (Cohen & Yankowski, 1998). Expert opinions of earning capacity are essentially prospective, projecting the expected earnings of a worker who chooses to maximize actual earnings. Accordingly, earning capacity is normally not influenced by a worker's vocational choices, but instead assumes he or she will fully exercise his or her inherent abilities. Earning capacity opinion formulation involves synthesizing the multitude of data elements that include both supply and demand side variables.

Work Life Participation. Work life participation is an emerging topic in the area of forensic vocational consultation. Gamboa and Gibson (2006) defined work life as the "total number of years in aggregate that an individual is likely to be alive and employed." Various

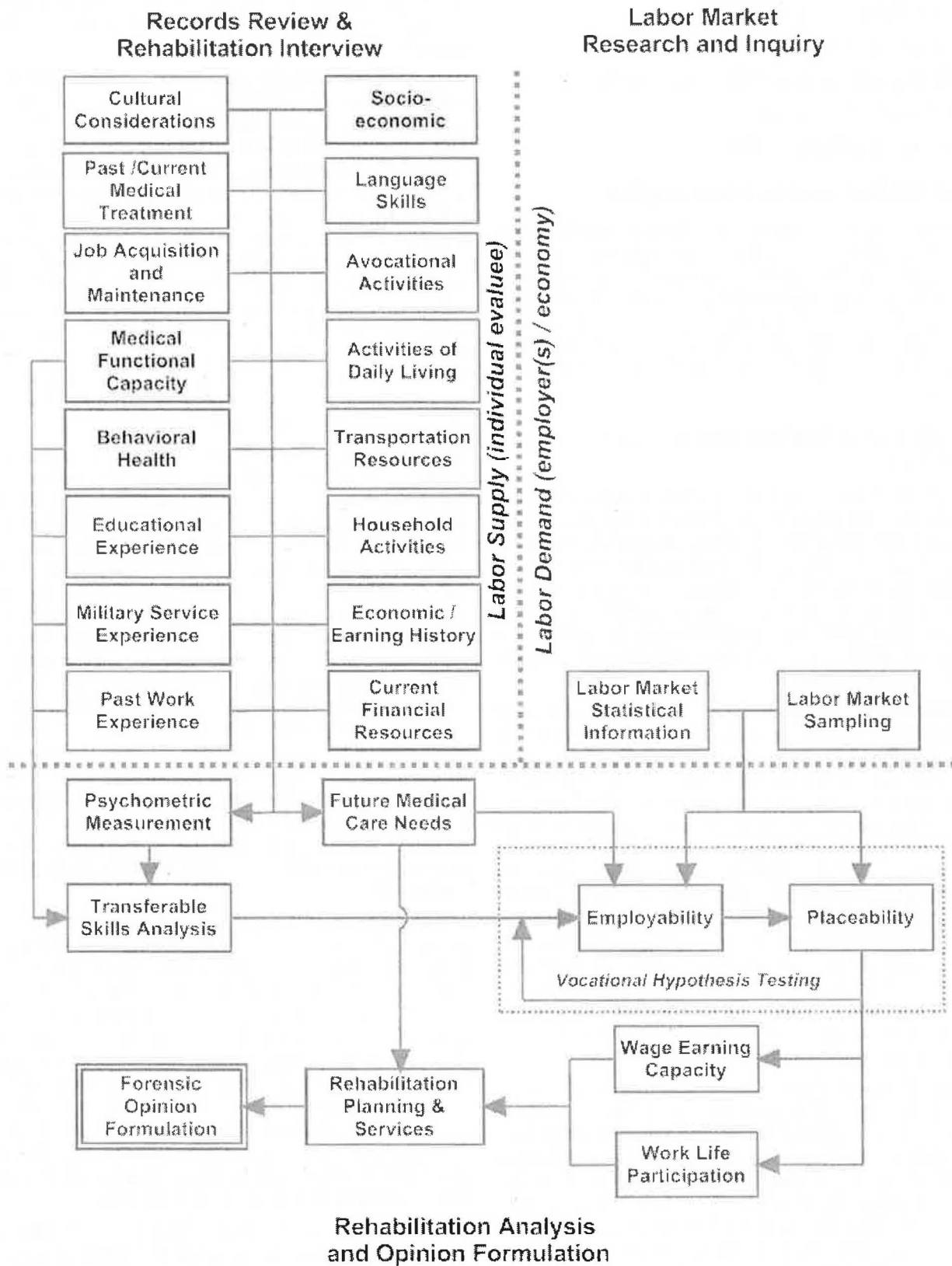


Figure 1. Vocational and Rehabilitation Assessment Model (VRAM)

authors have proposed methods for evaluating the longevity of a person's participation in the labor market (Ciecka & Skoog, 2001; Gamba & Gibson, 2008; Richards & Solie, 1996; Robinson and Spruance, 2011; Smith, 1982; Spruance, Robinson, & McKay, November, 2008; Spruance, Robinson & Pomeranz, November, 2010). While experts generally agree that work life is a critical element in an assessment of vocational earning capacity, there is generally a lack of consensus on how the concept is best evaluated (Field & Jayne, 2008).

The literature supports consideration of the consistency of an evaluatee's past work as a reflection of probable future work participation. Research has shown a relationship between interruption in employment and the erosion of accumulated human capital while removed from the labor market (Mincer & Ofek, 1982). Mincer & Ofek found the longer the interruption in work participation, the greater the impact on human capital erosion and subsequent wage level upon labor market reentry. Heckman & Borjas (1980), found "the greater the number of previous spells of unemployment and the longer the duration, the more likely is the event that an individual will be unemployed at a point in time" (p. 247).

Literature support was identified for the relationship between medical treatment of a health-related condition and the impact of treatment upon a person's future work participation. Certain chronic health conditions may limit a person to less than full time work due to participation in active medical treatment for an acute or chronic healthcare condition. Multiple studies have found that chronic health conditions are a significant driver of workplace absences (Collins et al., 2005; Stewart, Ricci, Chee, & Morganstein, 2003). Multiple studies have investigated the negative effects of specific chronic health conditions on work related absence. Such studies were identified for migraine headaches (Gerth, Carides, Dasbach, Visser, & Santanell, 2001; Lofland & Frick, 2006; Stewart, Lipton, & Simon, 1996); rheumatoid arthritis (Kessler et al., 2008); diabetes mellitus (Ng, Jacobs, & Johnson, 2001; Rodbard, Fox, & Grandy, 2009); allergies (Blais, 2000); mental health (Berndt, Bailit, Keller, Verner, & Finkelstein, 2000; Greenberg, Stiglin, Finkelstein, & Berndt, 1993; Stewart, Ricci, Chee, Hahn, & Morganstein, 2003) and back pain (Dagenais, Caro, & Haldeman, 2008; Hagan, Tambs, & Bjerkedal, 2002; Maetzel & Li, 2002).

The issue of retirement is also an important consideration in analyzing work life participation. In many cases, retirement results in a reduction of participation in work related activity. In a study by Uccello (1998), three key findings were discussed. First, workers with pension coverage are more likely to retire than are workers who do not have such coverage. Second, workers who face loss of health insurance bene-

fits after retiring are less likely to retire. Lastly, workers with chronic health conditions or who are in poor health are more likely to retire than are persons in good health. Montalto, Yuh, & Hanna (2000) found a worker's health status coupled with the physical demands of the job were principle determinants in whether a worker extends his or her work life.

Rehabilitation Planning and Services

Rehabilitation planning involves developing and detailing an evaluatee specific plan aimed at sustaining or improving physical, psychosocial, educational, and vocational functioning. Development of the rehabilitation plan involves consideration of data extracted from all three modules of the VRAM model. Data is synthesized into recommendations that are operationalized into measurable objectives with a specific timeline and when possible, associated costs.

Forensic Opinion Formulation

Opinion formulation involves summarizing the many conclusions that are drawn throughout the model. For example, the basic foundation of variables is identified through file review and a clinical interview. Conclusions drawn from review of records and the interview provide the foundation for psychometric instrument selection, transferable skills analysis, and clarification of future medical care needs. These findings directly influence the employability and placeability analysis of jobs considered suitable for the evaluatee. Once conclusions are drawn regarding an evaluatee's vocational employability and placeability, opinions are then formed of the evaluatee's earning capacity and work life participation. Each of the conclusions drawn to this point influence and guide the formulation of the rehabilitation plan and the necessary services recommended for the evaluatee. Each decision or conclusion drawn within the rehabilitation analysis and opinion formulation module should be summarized. This step in the VRAM model allows opinions and conclusions to be clearly stated which minimizes error in interpretation. Such a summary may also be useful for presenting opinions and conclusions to a trier of fact or jury.

Summary

The Vocational and Rehabilitation Assessment Model (VRAM) is an empirically derived structural model of vocational and rehabilitation assessment in a legal forensic setting. The model provides a clear picture for visualizing the relationship and interaction of construct domains considered core to forensic rehabilitation assessment. Discrete considerations are given to both economic supply and demand and how these features influence the vocational and rehabilitation process.

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