The Earning Capacity Assessment Form: An Exploratory Study to Assess the Feasibility of Establishing Cut-Off Scores to Determine Impairment to Earning Capacity Ratings

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Users of the Earning Capacity Assessment Form (ECAF), an instrument developed to assist evaluators of claims of loss of earning capacity, often request guidelines for scoring and arriving at loss of earning capacity opinions. This study investigated the feasibility of establishing ECAF cut-off scores to facilitate evaluators' analyses. Seven practicing vocational experts and 14 insurance company employees used the ECAF to respond to questions about loss of earning capacity claims presented in four case studies. The groups generally concurred in both the merits of a loss of earning capacity claim and the degree of loss of earning capacity sustained. Overall, results from bivariate correlational analyses between ECAF Driver/Inhibitor scores and loss of earning capacity assessments led the investigators to conclude that support from this exploratory study was insufficient to proceed with a determination of ECAF cut-off scores to assign impairment to earning capacity ratings. Complex arithmetic relationships among ECAF factors are discussed and additional research is proposed. Statistically significant correlations between ECAF Inhibitor scores and loss of earning capacity determinations emerged in cases involving no loss and mild loss of earning capacity scenarios

The Earning Capacity Assessment Form (ECAF) (Shahnasarian, 2001; 2004a) became available commercially in 2004 (Shahnasarian, 2004c) to help vocational evaluators perform valid and reliable analyses of loss of earning capacity claims. It is used most often in cases involving allegations of acquired disabling problems with concomitant loss of earning capacity claims in medical malpractice and personal injury litigation.

Attaining and reporting objective, accurate, and consistent measurements based on scientific foundations of vocational rehabilitation are a vocational evaluator's raison d'etre; however, wide variances in expert opinions too often occur. In an investigation of trial lawyers' perceptions of vocational rehabilitation methodologies, for example, Shahnasarian and Lassiter (2002) found lawyers had little confidence that vocational experts' methodologies were either objective or consistent. The examiners hypothesized that the litigation context – namely, a complex, adversarial environment in which suspicion, mistrust, competing motives, and many other dynamics interact unpredictably and are the rule of the day – contribute to these perceptions. Other presumed reasons for

the lawyers' skepticism included true inconsistencies and bias by experts desiring to win a retaining lawyer's favor, and inexperience among experts conducting assessments of earning capacity.

Regardless of the reasons for inconsistent assessment results, lack of consistency among experts who analyze a fixed pattern of facts and apply a generally accepted methodology to perform a vocational rehabilitation evaluation denigrates the profession and lends disservice to jurisprudence.

Several consonant methodologies for conducting a vocational rehabilitation evaluation to construct an opinion on loss of earning capacity have been proposed (e.g., Dillman, 1998; Parker & Schaller, 1998; Shahnasarian, 2001; Sleister, 2000; Tate, Heinrich, Paasuke, & Anderson, 1998; Weed, 1999). While the methodologies provide useful procedural frameworks, validated procedures and resources are needed to promote accuracy in analyses undertaken to address vocational experts' ultimate referral questions: Is a claim of loss of earning capacity merited? If so, what is the loss?

The ECAF has been among the most frequent measures of vocational rehabilitation potential researched during the past decade. Since its inception, users have inquired about establishing cut-off scores to assign overall loss of earning capacity ratings.

Presented below is background information about the ECAF – including its postulates, use, and validation and reliability studies. Next, the examiners describe an exploratory study undertaken to investigate the feasibility of assigning cut-off scores to assessments of loss of earning capacity evaluators determined from sequential analyses of the ECAF's 14 factors. The article concludes with a discussion of the results and recommendations for future ECAF use.

Postulates Undergirding the Earning Capacity Assessment Form

A fundamental ECAF premise is that individual characteristics are critical to evaluate when conducting a loss of earning capacity analysis. While the ECAF helps to assess individual factors, Shahnasarian (2001; 2004b) has emphasized that it should not be used as a sole outcome measure, and other information – such as statistical data along the lines Gamboa (2007) has espoused – is sometimes important to integrate in an assessment of a loss of earning capacity claim. Overrelying on aggregate statistical data while giving short shrift to individual characteristics, however, compromises precision and leads to depersonalization of an analysis. This latter problem also impairs an evaluator's ability, in cases where an individual may be foreclosed from returning to work in a prior occupation, for example, to determine vocational rehabilitation interventions that can offset potential loss of earning capacity.

Nine postulates undergird the ECAF's analytical scheme (Shahnasarian & Leitten, 2008a). These postulates, below, include an assessment of relevant drivers – factors that could facilitate an individual's vocational rehabilitation, and inhibitors – factors that could adversely affect one's vocational rehabilitation.

Postulate #1: When evaluating loss of earning capacity claims, premorbid and postincident factors could be facilitative (drivers) as well as detrimental (inhibitors) to a claimant's vocational rehabilitation. These factors merit analysis.

Postulate #2: ECAF factors that are drivers include low scores on measures of the following:

- Stability of Career Development
- Work Propensity
- Demonstrated Earnings History
- Career Motivation
- Cognition

Postulate #3: ECAF factors that are inhibitors include high scores on measures of the following:

- 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
- Vocational Adjustment Issues

Postulate #4: Drivers and inhibitors can be quantitatively and qualitatively evaluated by qualified vocational rehabilitation evaluators.

Postulate #5: Drivers and inhibitors have an interactive effect on vocational rehabilitation potential, assuming an individual is motivated to pursue vocational rehabilitation.

Postulate #6: Positive drivers can help mitigate earning capacity damages, assuming an individual is motivated for this.

Postulate #7: The ECAF can be used to generate a quantitative index of drivers.

Postulate #8: The ECAF can be used to generate a quantitative index of inhibitors.

Postulate #9: Driver and inhibitor indices can be used to assess claims of loss of earning capacity, with corresponding degrees of loss.

Earning Capacity Assessment Form Overview

Shahnasarian (2007) detailed the ECAF's development, use, and applications. Briefly, the ECAF is based on a review of literature from psychology, career development, economics, and vocational rehabilitation. It includes 14 factors germane to evaluators' assessments of claimed loss of earning capacity. These factors, along with their definitions, appear in Figure 1.

Four statements, arranged in a graduated, hierarchical sequence, accompany each ECAF factor. Within a given cluster of statements, the first generally suggests either a high level of vocational functioning or an absence of an impediment to career development. Subsequent statements reflect progressively increasing levels of potential career-related problems that could affect future earning capacity. The first statement is often an asset to future career development. For example, ratings from which evaluators are to choose for the cognition factor include:

0 Cognitively intact

1 Mild cognition problems, not anticipated to impact future career development

2 Cognitive deficits will adversely impact career development

3 Cognitive deficits preclude gainful work participation

The ECAF's graduated rating scheme allows for systematic analysis, assessment, and valuation of phenomena (i.e., factors influencing earning capacity), while also incorporating practitioners' clinical judgments. ECAF users should incorporate both premorbid and postincident claimant factors in their analyses (Shahnasarian, 2001; 2004a; 2007). Premorbid factors refer to claimant characteristics and circumstances predating the onset of problems potentially impairing earning capacity; postincident factors refer to noteworthy claimant characteristics and circumstances postdating an incident in question

Also included in the ECAF is an impairment to earning capacity scale, presented inFigure 2. It provides a point of reference for assessing overall loss of earning capacity. The scale ranges from 0% (no loss or impairment of earning capacity) at one limit to 100% (total loss of earning capacity) at the other limit. Within these limits are qualitatively identified degrees of loss of earning capacity with corresponding quantitative indices:

- Mild (loss of earning capacity from 1% to 20%)
- Moderate (loss of earning capacity from 21% to 50%)
- Severe (loss of earning capacity from 51% to 80%)
- Extremely Severe (loss of earning capacity from 81% to 99%)

An analysis of potential career-related problems from the ECAF factors, as well as an analysis of viable means to mitigate or offset the adverse impact a factor foreshadows, provides a basis for applying the impairment to earning capacity rating scale. The use of a continuum offers points of reference to describe the global impact on earning capacity given an evaluator's assessment and the facts specific to a case.

Earning Capacity Assessment Form Use

The ECAF is not intended to provide absolute, definitive answers. Rather, its purpose is to promote objectivity, standardization, and systematic consideration of factors pertinent to an assessment of earning capacity (Shahnasarian, 2001; 2004b). The ECAF is most effectively used in conjunction with a clinical interview, records review, and other vocational rehabilitation assessment methodologies Shahnasarian (2004b; 2007) described.

Figure 3 presents a matrix offering guidance in the differential analyses of earning capacity questions. It addresses interactions between an evaluator's prognosis for vocational rehabilitation (good, fair, guarded, poor) and three important prognosticators of vocational rehabilitation and earning capacity:

- Accessibility to preinjury occupations and career development opportunities
- Likelihood of generating compensation at levels commensurate with preinjury levels
- Viability of continuing career development

Included in the matrix are guidelines to assess degree of loss of earning capacity.

The ECAF is a resource to facilitate systematic analysis and appraisal rather than a self-standing outcome measure. Shahnasarian (2004d) detailed its limitations along with its intended uses. In a review of four mainstream methods for evaluating earning capacity, Field (2008) referred to the method incorporating the ECAF as a "practical" approach that is a "rather straightforward and commonsense method (p. 28)."

Earning Capacity Assessment Form Validity Studies

The ECAF's initial validation study (Shahnasarian, 2004d) involved 78 vocational rehabilitation counselors employed by the Florida Division of Vocational Rehabilitation Services. Subjects were randomly assigned either to a control group or to one of two experimental groups in which the ECAF was used to help evaluate claims of loss of earning capacity presented in three fact patterns. In all cases, variances within experimental group assessments were significantly less than variances among control group subjects. Further, subjects' use of the ECAF reduced

Figure 1. ***The 14 ECAF Factors with Definitions***

Stability of Career Development: consists of longevity of employment with previous employers, consistency between types of jobs performed and industries within which subject has worked, eligibility for rehiring with prior employers, and continuity of employment.

Work Propensity: subject's historical level of work participation including proclivity to pursue overtime work and supplemental employment.

Demonstrated Earnings History: earnings levels a subject has demonstrated a capacity to attain.

Phase of Career Development: age, level of career maturity, and vocational accomplishments with respect to status within one of five progressive career development phases – growth, exploration, establishment, maintenance, and withdrawal.

Subject-Specific Issues: life and/or personal circumstances that may impact subject's ability to pursue work-related activities.

Motivation: a personality trait affecting work tendencies and productivity. Indicators include record of career accomplishments and work participation, initiatives to enhance existing skill set, reasonableness of job search efforts, attempts to return to work after acquiring disabling problem, efforts to pursue rehabilitative services to help overcome work-related obstacles, and subject's use of discretionary time to further career development.

Ability to Apply Prior Skills: based on transferability of skills – subject's ability to apply previously developed work skills and specialized knowledge to meet the requirements of jobs or occupations other than what subject has performed in the past. Factors such as vocational adjustment issues, physical and cognitive capacity for retraining, and available resources should be considered.

Future Career Development Prospects: a general awareness of what could impact subject's future employability. Dependent upon factors such as industry trends, marketplace changes, and modification of management philosophy.

Cognition: subject's thought processing and mental functioning abilities. Deficits may be congenital, due to medication, or stem from events such as a head injury, a cerebrovascular accident, dementia, or a mental disorder.

Prognosis: expectancy of how disabling problems and vocational handicaps will impact subject over remainder of work life, including future earning capacity.

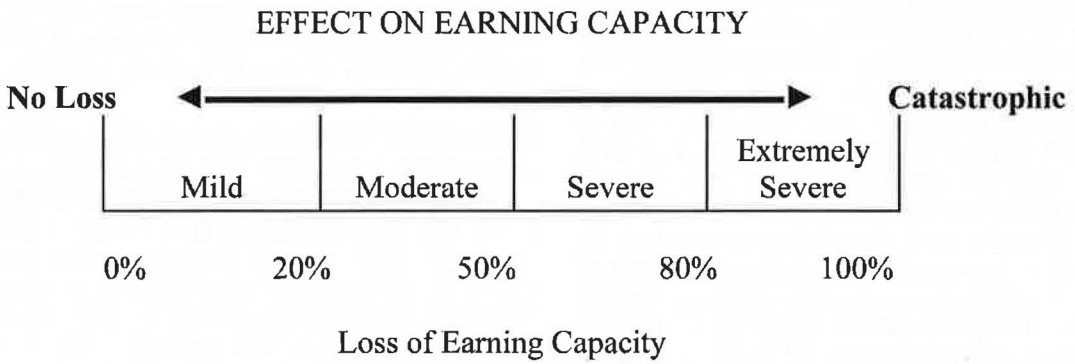
Need and Capacity for Retraining: necessity for subject to undergo retraining in order to realize earning capacity; may involve consideration of subject's capacity for retraining.

Preexisting Vocational Handicaps: includes subject's premorbid medical and psychological history, and level of functioning. Unrelated disabling problems may synergize to yield a compounded disabling outcome.

Acquired Vocational Handicaps: factors that can adversely impact present and future career development, including diminished access to work opportunities, need for workplace accommodations, employer bias in hiring and advancement, and diminished work life expectancy.

Vocational Adjustment Issues: difficulties subject may realize when career transitioning due to vocationally related and subject-specific characteristics that may inhibit or facilitate positive vocational adjustment. A subject's capacity to make a positive vocational adjustment depends upon ability to recover from setbacks posed by newly acquired disabling problems.

Figure 2. ***Impairment to Earning Capacity Rating Scale***



Shahnasarian, M. (2001). Figure 3.4. Assessment of Earning Capacity. Tucson, AZ: Lawyers and Judges Publishing Company.

within-group variances in estimates of loss of earning capacity.

In a study examining the relevance of the ECAF's 14 factors, practicing vocational rehabilitation experts used the ECAF to assess 70 pending claims of lost earning capacity (Shahnasarian & Leitten, 2006). In 74.5% of the cases, the experts agreed or strongly agreed that the ECAF facilitated efforts to discern a loss of earning capacity, and the factors of motivation and cognition were most often identified as material in identifying potential loss of earning capacity. Correlations among the 14 ECAF factors were computed.

Not surprising, the highest correlation (.848) was between demonstrated earnings history and work propensity. A factor analysis yielded three clusters with Eigen values ranging from 1.02 to 4.98; these three clusters accounted for 47.1% of the total variance (Cluster I = 24.34%; Cluster II = 15.73%; and Cluster III = 7.10%).

The investigators identified the following themes among ECAF factors loading heavily on the respective factors:

Cluster I, composed of five ECAF factors (stability of career development, work propensity, demonstrated earnings history, career motivation, and need and capacity for retraining) represents global factors affecting career development (cluster loadings ranged from .56 to .94).

- Cluster II, also composed of five ECAF factors (phase of career development, future career development prospects, prognosis, acquired vocational handicaps, and vocational adjustment issues), represent disability-related factors (cluster loadings ranged from .52 to .66). The investigators deemed Cluster II factors disability-related factors.
- Cluster III included a sole ECAF factor: ability to apply prior skills (the cluster loading was .71). Accordingly, the investigators termed Cluster III ability to apply prior skills.

The 2006 Shahnasarian and Leitten study also examined the frequency vocational experts deemed an ECAF factor as germane in a pending evaluation. Cognition and career motivation were the most frequently cited ECAF factors: cognition was cited as pertinent in 69.6% of the cases, and career motivation was cited in 66.7% of the cases

Shahnasarian and Leitten (2008a) reported a longitudinal study in which positive work attitudes were highly predictive of return to work and minimal loss of earnings – especially when accompanied by higher levels of intelligence; this finding supported the investigators' 2006 factor analysis results. The study incorporated both demographic variables and standardized test data to analyze ECAF factors and to configure models predictive of return to work. Subjects participated in a telephone interview from 5 to 7 years after undergoing a vocational rehabilitation evaluation in conjunction with a pending claim of loss of earning capacity. Fifty-four percent of the subjects reported postevaluation employment and 45.8% reported being employed at the time of their interviews. Significant positive correlations were found during the 5- to 7-year measurement interval between return to work and the following variables: Education, Verbal IQ, and Full Scale IQ. Further, a significant inverse correlation between return to work and scores on the MMPI-2 L-scale emerged. A stepwise discriminant function analysis found that use of two variables, Full Scale IQ and Work Interference scale scores from the MMPI-2, resulted in an 83.3% correct return-to-work classification rate.

Earning Capacity Assessment Form Reliability Studies

Shahnasarian and Leitten (2008b) evaluated the reliability of the ECAF, using a test-retest design over a 2-week interval. Twenty-five subjects applied the ECAF to three case studies. Test-retest reliability coefficients measuring subjects' assessments of loss of earning capacity ranged from .85 to .97 ($p < .01$), with an overall correlation coefficient of .98 ($p < .01$). As subjects gained experience using the ECAF, they reported its utility increased. For all three cases, test-retest correlations measuring subjects' assessments of percent loss of earning capacity were significant at the .01level. The overall test-retest reliability coefficient for this variable, collapsed across all cases, was .98.

Test-retest correlation coefficients for the 14 ECAF factors were also computed by case. Thirteen of the 14 correlation coefficients (92.9%) were significant at either the .05 or the .01 level; Acquired Vocational Handicaps was the lone ECAF factor not to rise to the level of statistical significance.

When examined cumulatively by case, all 14 ECAF factors yielded test-retest correlation coefficients significant at the .01 level. Demonstrated Earnings History had the lowest coefficient (.61). Three ECAF factors – Ability to Apply Prior Skills, Cognition, and Vocational Adjustment Issues – had the highest coefficients (.94).

In sum, the most important data from this inquiry relates to the research question: Is the ECAF a reliable measure to apply in assessments of loss of earning capacity claims? The results affirmed the ECAFs reliability, as evidenced by test-retest reliability coefficients ranging from .85 to .97 ($p < .01$) on measures of percent loss of earning capacity, and an overall .98 ($p < .01$) correlation between subject ratings of the three case studies evaluated 2 weeks apart.

All 14 ECAF factors demonstrated significant test-retest reliability across the three case studies, lending credence to the ECAF postulates related to the measurement of drivers and inhibitors, as well as to overall ability to apply the ECAF to measure loss of earning capacity.

Methodology

Subjects

Twenty-one individuals experienced in evaluating claims of loss of earning capacity served as subjects. The sample included seven practicing vocational experts and 14 employees – adjusters and in-house counsel – of a large, national automobile insurance company. Subjects were randomly selected.

The vocational experts' practices were dispersed throughout the United States. All held graduate degrees along with two or more specialty credentials. Their average years of experience was 17.6 (SD = 12.4) and they conducted an average of 14.6 assessments of claims of loss of earning capacity per year (SD = 20.7).

Based in the Southeast, the insurance company employees had an average of 15.9 years of education (SD = 1.6). Their average years of experience was 12.5 (SD = 6.9) and they conducted an average of 20.9 assessments of claims of loss of earning capacity per year (SD = 30.2). Twelve were employed as adjusters and two were employed as attorneys. All adjusters were credentialed within their industry and several held multiple industry-related credentials.

Procedures

First, subjects received an orientation to the ECAF and instructions on its use. Then, they reviewed four case studies (please refer to the Appendix), each included a fact pattern providing basic information necessary to evaluate a claim of loss of earning capacity. The case studies, based on actual cases, present a range of earning capacity loss scenarios. Based on their experience with prior case studies used in ECAF research, the investigators predetermined the fact patterns likely would cause subjects to deduce loss of earning capacity assessments as follows:

- Case A – Catastrophic
- Case B – No loss
- Case C – Moderate/Severe
- Case D – Mild

It should be noted that post hoc analyses of subjects' loss of earning capacity determinations were consistent with the investigators' appraisals.

Subjects used the ECAF to conduct analyses of the four cases, rate the 14 ECAF factors by case, and ultimately determine an overall assessment of impairment to earning capacity rating by case. Finally, after completing the ECAF, subjects responded to questions eliciting additional information about their experiences, including assessments of the instrument's utility.

Results

For purposes of this exploratory study – namely, to assess the feasibility of establishing ECAF cut-off scores – evaluators' ratings of ECAF items loading on Driver and Inhibitor scales, respectively – were totaled and statistically analyzed. The data analysis included between groups (i.e., practicing vocational experts ver-

Figure 3. ***Guidelines for Assessing Degree of Loss of Earning Capacity***

Vocational Rehabilitation Variable	Prognosis: Good	Fair	Guarded	Poor
Accessibility to premorbid occupations and career development opportunities	No Loss/ Mild	Mild/ Moderate	Moderate/ Severe	Extremely Severe/ Catastrophic
Likelihood of generating compensation at a level commensurate with premorbid level	No Loss/ Mild	Mild/ Moderate	Moderate/ Severe	Extremely Severe/ Catastrophic
Viability of continuing career development	No Loss/ Mild	Mild/ Moderate	Moderate/ Severe	Extremely Severe/ Catastrophic

sus insurance company adjusters) comparisons and aggregate-subject analyses.

One-way ANOVAs comparing the means of vocational experts' and insurance company employees' driver scores, inhibitor scores, and percent loss of earning capacity ratings showed no significant differences between the two groups on these variables in the first two cases. For Case C, a significant difference emerged between the groups on the percent loss of earning capacity measure, $F(1, 19) = 15.39$, $p = .001$. Overall, vocational experts determined the case merited a higher percentage loss of earning capacity than did insurance company employees (i.e., 75.7% versus 58.5%). For Case D, a significant between-groups difference emerged on ratings of percent loss of earning capacity, $F(1, 19) = 49.25$, $p < .001$, and inhibitor scores, $F(1, 19) = 13.26$, $p < .01$. Again, vocational experts determined the case merited a higher percentage loss of earning capacity (i.e., 24.3% versus 4.6%); they also computed higher inhibitor scores (i.e., 8.9 versus 4.3) than the insurance company subjects.

Subjects' group data was collapsed to conduct bivariate correlational analyses between ECAF Driver Scores and percent loss of earning capacity ratings, and between ECAF Inhibitor Scores and percent loss of earning capacity ratings. Table 1 provides case-specific information on subjects' assessments of examinee vocational rehabilitation prospects and loss of earning capacity assessments.

As Table 2 indicates, significant correlations emerged between ECAF Inhibitor Score and percent loss of earning capacity ratings for Case B (.59, $p < .01$) and Case D (.85, $p < .001$). Since no other bivariate correlations were significant, the examiners determined that the results did not support an attempt to derive cut-off scores for use with the impairment to earning capacity rating scale.

Subjects rated the ECAF's utility on a 5-point Likert scale, with limits designated as "strongly agree" and "strongly disagree." In Case A, subjects agreed or strongly agreed that the ECAF enhanced their evaluations at least 60% of the time. For Cases B, C, and D, this number rose to 79%, 84.3%, and 80%, respectively. Qualitative comments about the ECAF included the following statements: "Enabled me to organize my thinking and consider all relevant considerations," and "Helped distinguish non-relevant factors and clarify critical factors to substantiate LOEC [loss of earning capacity]."

A Chi square analysis examined subjects' ratings of ECAF utility in cases where claimants' capacity for vocational rehabilitation was determined good/poor or fair/guarded. Hypotheses that the ECAF would be perceived as less useful in extreme cases (i.e., good/poor prognoses for vocational rehabilitation) and found more helpful in "gray area" cases involving assessments of claims of loss of earning capacity (i.e., fair/guarded prognoses for vocational rehabilitation) were supported, $\chi^2 (1, N = 84) = 5.63$, $p < .05$.

Discussion

Between group analyses of driver scores, inhibitor scores, and percent loss of earning capacity ratings across the four cases indicate no significant differences emerged in 9 of 12 (75%) analyses. Generally, vocational experts and insurance company employees viewed the loss of earning capacity claims similarly. When significant differences arose, the insurance company employees were more conservative in their damages appraisals; vocational experts assigned higher percentage of loss of earning capacity in both cases where significant differences on this variable were present, and they determined the presence of more inhibitors in the third instance of significant between-group differences.

It is interesting to note that the significant between-group differences occurred in Cases C and D –

Table 1. ***Assessments of Vocational Rehabilitation Prospects and Loss of Earning Capacity by Case***

	Case Evaluated			
	Case A	Case B	Case C	Case D
Number of Subjects Determining:	(Catastrophic)	(No Loss)	(Moderate/Severe)	(Mild)
A Loss of Earning Capacity	21 (100%)	4 (19%)	21 (100%)	12 (57.1%)
Examinee is a Vocational Rehabilitation Candidate	0 (100%)	9 (42.9%)	18 (85.7%)	14 (66.7%)
Prognosis for Vocational Rehabilitation				
Good	0 (0%)	9 (42.9%)	16 (76.2%)	16 (76.2%)
Fair	0 (0%)	3 (14.3%)	5 (23.8%)	2 (9.5%)
Guarded	0 (0%)	5 (23.8%)	0 (0%)	0 (0%)
Poor	21 (100%)	1 (4.8%)	0 (0%)	0 (0%)
Mean Driver Score	5.33 (SD=3.37)	6.67 (SD=2.13)	0.19 (SD=0.68)	1.33 (SD=1.28)
Mean Inhibitor Score	23.19 (SD=2.68)	4.29 (SD=3.47)	8.81 (SD=3.01)	5.81 (SD=3.44)
Mean Percent Loss of Earning Capacity	99.05% (SD=2.56)	2.33% (SD=5.99)	64.29% (SD=12.38)	11.19% (SD=11.17)

Note: n=21

Table 2. ***Correlations Between Percent Loss of Earning Capacity and Driver/Inhibitor Scores***

Variable	Correlation	Significance
Case A – Catastrophic		
Driver Score	-.019	0.934
Inhibitor Score	.137	0.553
Case B – No Loss		
Driver Score	.248	0.278
Inhibitor Score	.592	0.005*
Case C – Moderate/Severe		
Driver Score	-.161	0.485
Inhibitor Score	-.111	0.631
Case D – Mild		
Driver Score	-.082	0.725
Inhibitor Score	.845	0.000*

Note: $n = 21$. * $p < .01$

cases involving mild and moderate/severe loss of earning capacity, rather than the extreme no loss and catastrophic loss case study scenarios. Insurance company employees typically do not have clinical contact with a claimant, and they generally do not have experience practicing vocational rehabilitation. This could explain their tendencies, in comparison to vocational experts, to underestimate inhibitors to pursuing vocational rehabilitation and, correspondingly, how earning capacity can be adversely affected. Of course, some might also argue that other factors – such as occasional exposure to fraud cases, claimant overstatement of damages, experiences with lawyers overreaching on damages claims, and an employment environment in which frugal claims management is rewarded – may also cause insurance company employees to view skeptically "gray area" claims, such as those presented in Cases C and D.

Bivariate correlational analyses of all subjects' data were conducted to examine relationships between ECAF Driver Scores and percent loss of earning capacity ratings, and between ECAF Inhibitor Scores and percent loss of earning capacity ratings. Only two of the eight coefficients were significant; accordingly, the investigators concluded that the findings provided insufficient support to proceed with a determination of ECAF cut-off scores to assign impairment to earning capacity ratings. The significant correlations involved Inhibitor scores in the no loss and minimal loss of earning capacity case studies. In both cases, mean scores were relatively low, suggesting subjects determined the respective claimants had few barriers to pursuing vocational rehabilitation. This finding provides a basis to surmise that, in cases involving minimal claims of loss of earning capacity, an analysis of ECAF inhibitor factors can significantly enhance precision in evaluating overall impact on loss of earning capacity appraisals.

Analyses of case-specific data are useful in understanding why few significant bivariate correlations emerged. In Cases A (catastrophic loss of earning capacity) and C (moderate/severe loss of earning capacity), for instance, subjects assigned very high inhibitor scores (M = 23.19) to the 19-year-old comatose claimant described in Case A, and much lower inhibitor scores to the injured physician described in Case C (M = 8.81). All subjects agreed the comatose claimant's prognosis for vocational rehabilitation was poor, and 57.2% of subjects assessed the physician's prospects for vocational rehabilitation to be either good or fair. These results are consistent with deductions one would intuitively make. An analysis of subjects' differential responses to ECAF Inhibitor factors in the two cases indicates the comatose claimant possesses two vocational rehabilitation advantages over the injured physician in the midst of retraining: an earlier phase of career development and an absence of preexisting vocational handicaps. Of course, the fact patterns considered in toto obviate any suggestion that the comatose patient is in an advantaged position. Nonetheless, these features of the comatose claimant's vocational profile somewhat offset the overall deleterious set of ECAF inhibitors to vocational rehabilitation he acquired. This analysis illustrates how the overall measurement of a main effect (i.e., ECAF Inhibitor score) can be diminished by components of factor loadings (i.e., ECAF Inhibitor items), and provides perspective on why relatively few bivariate correlations were significant at the .05 level.

Shahnasarian (2004d) noted that, unlike the relatively mechanical processes involved in a physician's assignment of an impairment rating vis-à-vis the *Guides to the Evaluation of Permanent Impairment, 6th Edition* (Rondinelli, 2008) or a psychologist's diagnosis of a disorder using the *Diagnostic and Statistical Manual of Mental Disorders TR* (American Psychiatric Association, 2000), the assessment of a claim of loss of earning capacity requires a more analytical process. It relies on a blend of quantitative analyses (e.g., assessment of standardized test results, demonstrated academic and occupational achievements, and labor market information from collateral sources) integrated with knowledge of vocational rehabilitation. Analyses of these sorts are especially complex. Every earning capacity deliberation has inherent subtleties and nuances that merit special consideration.

Results from this exploratory study support the notion that an evaluation of a claim of loss of earning capacity belies the simple mechanical application of a formula or checklist. While there is empirical support for applying ECAF factors in analyses, the derivation of an integrated, systematic method of computing loss of earning capacity estimates is far more complex than simply tallying drivers and inhibitors to vocational rehabilitation. Cut-off scores based on ECAF factor ratings may be feasible to establish; however, this likely will be predicated on the establishment of curvilinear, multifactorial, and other complex arithmetic relationships among ECAF factors.

Similar to other studies involving the ECAF (e.g., Shahnasarian, 2004d; Shahnasarian & Leitten, 2006; Shahnasarian & Leitten, 2008b), subjects responded positively on measures of the instrument's utility. This was especially the case when fact patterns included "gray area" information; in all cases other than the catastrophic case (Case A), subjects agreed or strongly agreed 79% or more of the time that the ECAF enhanced the precision of their evaluations. Given the rather obvious nature of facts in the catastrophic case, it is unlikely in a clinical practice setting that a vocational evaluator would even apply the ECAF; hence, ratings of the ECAF's comparatively less utility in this case are understandable.

Finally, the results support the postulates undergirding the ECAF, and indicate that differentiation be-

tween driver and inhibitor factors provides a useful framework to describe vocational capacities/limitations. The evolution of ECAF research has contributed to an in-progress second edition of the instrument.

The small sample size of this exploratory study poses a limitation to both the generalizability of results and the types of analyses that can be performed. In addition to subjects composed of insurance company employees and vocational experts who use the ECAF, the use of matched control groups who evaluate claims of loss of earning capacity similar to those presented in this study without use of the ECAF may prove incisive. Additional research investigating whether subjects place more importance on ECAF Drivers or ECAF Inhibitors may also be instructive; research of this type would be a logical first step to investigate the existence of arithmetic relationships among ECAF factors as described above. Interestingly, significant findings between ECAF Inhibitor scores and loss of earning capacity ratings emerged in both "gray area" cases.

Shahnasarian (2004d) noted the ECAF can be particularly useful in cases in which the assessment of latent or future loss of earning capacity is intuitively evident but difficult to quantify, such as in cases involving:

- Pediatric patients with permanent injuries.
- Young adults and others early in their career development who, like pediatric patients, have not demonstrated an adequate baseline of historical earnings representative of preinjury earning capacity.
- Individuals who return to work, in either their preinjury job or an alternate job, and are anticipated to experience degenerative problems or other vocational handicaps.
- Cases in which an individual's earning capacity had not been optimized at the time career development was interrupted; for example, a college-educated individual who was actively raising children and not pursuing career development.
- Small business owners and other self-employed individuals who become compromised in ability to pursue career development but continue to pursue entrepreneurial activities.
- Individuals who lack a demonstrated earnings record.

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Biography

Michael Shahnasarian, Ph.D., and **Christopher L. Leitten, Ph.D.**, practice vocational rehabilitation with Career Consultants of America, Inc., in Tampa, Florida.

Appendix: Case Studies

Case A

Mr. C was a 19-year-old, full-time college student when he was a passenger in a single-vehicle roll-over-type accident. According to police records, after the vehicle came to rest, Mr. C was submerged and drowning from 10 to 15 minutes. His Glasgow coma scale score at the time the paramedics arrived was 3. Medical records indicate he experienced a subdural bleed, and two years after the accident physicians have determined that Mr. C is either in a persistent vegetative state or a minimally conscious state. Since his accident, he has been immobile, unable to speak, bowel and bladder incontinent, and totally dependent in activities of daily living. He also has secondary problems that include tachycardia, hypertension, and autonomic dysreflexia. Regarding his ability to communicate, Mr. C's primary caregiver noted Mr. C is able to communicate at a basic level, explaining, "If he's soiled, he starts screaming or crying [and] if he's in pain." The only employment Mr. C held prior to the accident was part-time work as a restaurant table busser. Because of his young age and phase of career development, Mr. C did not have an opportunity to either develop substantive work skills or convert his career development potential. Mr. C's mother testified in a deposition that, before becoming injured, her son aspired to pursue his career development as a medical sales representative. Mr. C has not had employment or otherwise pursued vocational rehabilitation since the accident. Two vocational rehabilitation experts – one retained by Mr. C's lawyer, and one retained by a defense lawyer – have opined that Mr. C has lost his entire earning capacity. The Social Security Administration has awarded Mr. C disability benefits. Mr. C has twenty-four hour skilled nursing care.

Case B

While riding a motorcycle, Mr. F was struck by a motor vehicle and sustained fracture injuries to his left lower extremity. He did not lose consciousness, and is not claiming to have sustained cognitive deficits. Two years after his accident, during examinations by vocational rehabilitation experts retained by Defense and Plaintiff counsel, Mr. F attributed the following problems to his accident: mid-back discomfort and reduced flexibility, left-lower extremity functional limitations, and left-arm range of motion limitations. Regarding his vocational background, Mr. F graduated from high school and was enrolled in a law enforcement training program at the time of his accident. He was 26-years-old at the time he became injured. Test results indicate Mr. F's intelligence is in the low average range. His preaccident work history was unimpressive, and included self-employment as a painter during the three-year period preceding his accident. Documented earnings during these years are below the minimum wage rate. Subsequent to his accident, Mr. F had reported pursuing work activity comparable to his preaccident work activity, although he noted he has not resumed law enforcement studies. While there are no physician restrictions or contraindications to him pursuing his career development as a law enforcement professional, Mr. F expressed to vocational experts that he does not believe he is able to perform job responsibilities required of a law enforcement professional. Physically, Mr. F presents as a large, imposing individual without overt manifestations of disabling problems. Surveillance documents Mr. F vigorously exercising his upper and lower extremities for multiple extended periods at a fitness center. A psychologist, retained by Defense counsel, suspects Mr. F is exaggerating his symptomology. Mr. F apprised a Defense-appointed vocational expert that he aspires to pursue employment as a wine and spirits sales representative.

Case C

Dr. A graduated in the top 10% of his medical school class, and then completed a three-year internal medicine residency. Other training he had included a two-year medical oncology fellowship, a one-year gastroenterology fellowship, and a one-year gastroenterology oncology fellowship. After his professional training, Dr. A relocated to a major metropolitan area where he pursued self-employment in a gastroenterology practice for approximately 25 years, before he fell off a ladder in his home and severely injured his left (nondominant) upper extremity. Subsequent to this accident, Dr. A underwent 18 operations on his injured extremity, along with extensive physical therapy and pain management. Chronic pain problems have persisted. Physicians who have examined Dr. A – both physicians retained by Plaintiff and De-

fense counsel – agree that he has a loss of range of motion and, because of a nonunion, experiences ongoing pain.

As a self-employed gastroenterologist, Dr. A had been performing many invasive procedures involving well-coordinated bimanual functioning. His extensive postinjury treatment was associated with numerous absences from his practice. Additionally, Dr. A assessed that his acquired disabling problems compromised his ability to realize the standard of practice associated with competently performing the gastroenterology procedures he performed before becoming injured. Accordingly, Dr. A eventually closed his gastroenterology practice.

At the time of his vocational rehabilitation examinations, Dr. A, age 58, was in the process of retraining: Specifically, pursuing a 1-year fellowship required to pursue his career development as a hepatology transplant specialist. This work is office-based, and generally involves taking patient histories and monitoring prescribed medications. Dr. A assessed that he is capable of performing the physical demands associated with the tasks a transplant hepatologist engages. Vocational experts retained by Plaintiff and Defense counsel agree that Dr. A will be capable of continuing his career development as a transplant hepatologist through the remainder of his work life; they also agree that, if not for his acquired disabling problems, he would have been able to realize a higher level of compensation had he not been injured and continued his prior private practice work. They disagree, however, on the extent of Dr. A's loss of earning capacity. The vocational expert retained by Plaintiff's counsel assesses that Dr. A's loss of earning capacity to be approximately 75% of his preinjury earning capacity; the vocational expert retained by Defense counsel assesses Dr. A sustained a loss earning capacity of approximately 30% to 50%. Before Dr. A became injured, earnings records indicate he reported annual employment earnings between $800,000 and one million dollars per year. Labor market research indicates that starting wages for transplant hepatologists, the occupation for which Dr. A is being retained, are in the range of $160,000 to $200,000 per year.

Case D

At the time of her motor vehicle accident, which occurred approximately 2 years prior to her vocational rehabilitation evaluation, Ms. C was employed as an account executive in an office environment. She underwent bilateral TMJ procedures and a left-knee operation. She has since continued to experience ongoing, bilateral jaw pain, continual neck pain and restricted range of motion, headaches, intermittent mid-back and lower-back pain secondary to activity, and occasional muscle spasms in the left shoulder and back. Ms. C denied acquiring any cognitive impairment. Regarding her academic background, Ms. C graduated from high school, enlisted in the United States Army, and pursued active duty status for 4 years, during this time she trained in human resource administration. She continues serving in the United States Army Reserves. At the time of her motor vehicle accident, she was pursuing associate degree studies; Ms. C completed degree requirements after the accident. Now age 20, Ms. C has been deployed to Iraq, where she is engaged in personnel administration work activities, in an office, on behalf of the United States Army. Before her car accident, Ms. C conveyed, she aspired to complete a bachelor's degree and pursue employment with the Department of Homeland Security; she noted an interest in border security, and also expressed interest in becoming an FBI agent. Physicians have recommended that Ms. C, however, restrict the type of work she pursues to the sedentary level, with opportunities to reposition as needed. Physicians have opined that future medical care is likely.

The defense vocational expert does not believe Ms. C sustained any loss of earning capacity; she asserts that Ms. C is employed and can still pursue college studies to enhance her earning capacity. The vocational expert hired by Ms. C's lawyer, on the other hand, believes there is a loss of earning capacity, although he assesses Ms. C's prognosis for vocational rehabilitation to be good. Specifically, he cites loss of access to preaccident work opportunities, postaccident vocational handicaps, and physicians' concerns about degenerative problems.