

# Assessing Vocational Rehabilitation Engagement of People With Disabilities: A Factor-Analytic Approach

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## Abstract

The purpose of this study was to validate the *Vocational Rehabilitation Engagement Scale (VRES)* in a sample of state vocational rehabilitation (VR) service consumers. A total of 277 individuals with disabilities were recruited from Alaska, Kentucky, Florida, Michigan, New Mexico, Texas, Utah, and Wisconsin. The measurement structure of the VRES was evaluated using exploratory factor analysis and confirmatory factor analysis. Exploratory factor analysis results support a one-factor measurement structure of the VRES. Confirmatory factor analysis results also indicated a good model fit for the one-factor measurement model. Internal consistency reliability (Cronbach's  $\alpha$ ) for the scores on the VRES was computed to be .94. VR engagement was found to be associated with working alliance, vocational self-efficacy, internal motivation, and VR outcome expectancy in the expected direction. The VRES is a brief, reliable, and valid instrument for assessing VR engagement and contributes to the use of self-determination as a paradigm for improving motivation and engagement of people with disabilities receiving services from state VR agencies.

## Keywords

vocational rehabilitation, client engagement, self-determination

Empowering individuals to actively engage in their own treatment is increasingly considered a cornerstone of high-quality health care and rehabilitation services (Barello, Graffigna, Vegni, & Bosio, 2014; Coulter, 2012; Kang, Magura, Blankertz, Madison, & Spinelli, 2006; O'Brien, White, Fahmy, & Singh, 2009; Ozelie et al., 2012; Tait, Birchwood, & Trower, 2002). A growing body of literature links patient engagement to health outcomes, health care costs, and patient satisfaction (Hibbard & Greene, 2013; Hibbard, Stockard, Mahoney, & Tusler, 2004; Wild, Cunningham, & Ryan, 2006). Conversely, disengagement or premature exit from a health or human service delivery system can cause significant losses including, but not limited to, a poor return on investment (Lequerica, Donnell, & Tate, 2009; Lequerica & Kortte, 2010; Medley & Powell, 2010). Approximately 50% of clients served by the state-federal vocational rehabilitation (VR) program exit prior to completion of services, and in fiscal year 2009, US\$325 million of VR funds were expended for cases closed due to refusal of services, clients' failure to cooperate, or an agency's inability to locate the client (Rigles, Ipsen, Arnold, & Seeking, 2011). Researchers, practitioners, and policy makers are beginning to assess the treatment goal of engagement as a variable to

gauge client motivation, contain costs, and improve the effectiveness of intervention strategies (Prendergast, Podus, Chang, & Urada, 2002; Simpson, 2004). Therefore, the development of a reliable and valid self-report measure of client engagement is an important VR research priority.

The terms *client engagement* and *patient activation* are often used interchangeably in both health care and rehabilitation services. However, these terms should not be confused with compliance or adherence, in which the focus is on clients' behaviors coinciding with the treatment regimen or medical advice (Arias-Llorente, Garcia, & Martin, 2012). Patient activation refers to patients' knowledge, skills, ability, and willingness to manage their own care (Hibbard & Greene, 2013). Patient engagement, a broader concept,

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entails interventions geared to increase activation and promote positive attitudes and behavior. Engagement, if managed carefully, can promote better care, improve health-related outcomes, and increase cost savings. However, there is little consensus on the definition of engagement, and limited effort has been devoted to carefully developing a measure to identify the factors that constitute the construct in VR (Hibbard & Greene, 2013; O'Brien et al., 2009).

Research on engagement has generally focused on questions of acuity, co-morbidities, adherence to therapeutic requirements, health promotion, disability or disease prevention, disability self-management, and patient participation in service planning. There are a number of existing methods for measuring the subjective components of engagement, including the following: (a) health locus of control (Wallston, Stein, & Smith, 1994), (b) self-determination (Vancampfort et al., 2013), (c) health self-efficacy (Lorig et al., 1996), (d) readiness to change health-related behaviors (DiClemente et al., 1991; Prochaska & Velicer, 1997), (e) therapeutic alliance with a health professional (Barber, Eccles, & Stone, 2001), (f) openness and participation within treatment (Simpson, 2004), and (g) general treatment satisfaction (Mavis & Stöffelmayr, 1994; Siqueland, Rynn, & Diamond, 2004). However, these scales tend to emphasize the individual behavior over contextual factors or disability characteristics (Hibbard et al., 2004). In addition to research on measures, contextual factors such as type of service provider and availability of information have also been explored (Gruman et al., 2010; Jones, Corrigan, James, Parker, & Larson, 2013). However, there is a scarcity of research on measuring client engagement in VR services. Despite the limited research within disability service contexts, client engagement should be one of the core goals of VR services.

The sociocontextual framework of self-determination theory (SDT; Deci & Ryan, 1985) has proven to be useful in explaining the motivation leading to health-related behavior change activities and, as a result, may prove useful in developing a theory-driven, valid measure of engagement in VR services (Hagger & Chatzisarantis, 2009). Self-determined motivation is related to high levels of interest, persistence, and satisfaction when engaging in health promoting activities. Emerging evidence supports the importance of self-determination to promote continued use of health care and rehabilitation services and active participation by consumers with disabilities (Kennedy & Gregoire, 2009; McBride, Koehly, Sanderson, & Kaphingst, 2010; Russell & Bray, 2010; Saebu, Sorenson, & Halvari, 2013; Vancampfort et al., 2013; Williams, McGregor, Zeldman, Freedman, & Deci, 2004). Motivation to engage is often facilitated by environments that support client autonomy (a sense of psychological freedom when engaging in an activity), competence (perceived capability to attain desired outcomes of self-efficacy), and relatedness (sense of social connection; Ryan & Deci, 2000). With enhanced motivation, individuals are

more likely to engage in VR services. As a result, increased engagement may increase outcome expectancy and support employment and other outcomes such as community integration, independence, self-esteem, and quality of life.

Measures of client engagement should include a variety of individual and contextual factors in a format that can facilitate its extension beyond treatment or therapy attendance and allow inclusion of the holistic processes from application for services to follow-up outcome (Kaphingst et al., 2014; Kortte, Falk, Castillo, Johnson-Greene, & Wegener, 2007; Munin et al., 2005). A number of measures of engagement exist in medical rehabilitation settings but an instrument specifically used for VR clients has yet to be developed and validated. For example, the *Hopkins Rehabilitation Engagement Rating Scale* (HRERS; Kortte et al., 2007), a clinician-rated five-item instrument, is a popular measure for assessing engagement with acute inpatient rehabilitation activities via behavioral observations. Similarly, the 15-item *Rehabilitation Therapy Engagement Scale* (RTES), developed by Lequerica et al. (2006), is used by physical therapists or occupational therapists during the first week of admission to a rehabilitation center to assess patients' level of adaptive rehabilitation engagement. Other engagement scales in rehabilitation medicine include the *Singh O'Brien Level of Engagement Scale* (SOLES; O'Brien et al., 2009), a 16-item instrument designed to measure engagement in mental health services among persons with psychosis, and the *Patient Activation Measure* (PAM; Hibbard et al., 2004), a 22-item instrument designed to assess level of patient engagement in health care services. Generally, these scales have good psychometric properties and are unidimensional in operationalizing engagement within a variety of clinical settings. However, these scales are of limited utility in VR services as they fail to include the critical elements of attendance, participation, and effort in working toward cooperatively established goals in assessing VR engagement.

## Rationale for the Study

Despite demonstrations of the positive effects of client engagement in health and rehabilitative care on outcomes, there is not a practical, valid, and reliable brief measure to assess client engagement in VR services. Therefore, the purpose of this study was to develop and validate a brief instrument to measure VR engagement.

## Method

### Participants

Participants in this study were 277 VR consumers recruited from a convenient sample of state VR programs located in Alaska, Kentucky, Florida, Michigan, New Mexico, Texas,

**Table 1.** Means and Standard Deviations for Each of the Items on the VRES, Factor Loadings, Eigenvalues, and Percentage of Variance Explained.

| Item  | M (SD)      | Factor loadings |
|---|-------------|-----------------|
| 1. I strive to complete assignments and rehabilitation activities agreed upon with my rehabilitation counselor. | 4.11 (0.93) | .78             |
| 2. I communicate with my rehabilitation counselor regularly.  | 3.82 (0.97) | .76             |
| 3. I show up for appointments related to my rehabilitation program.   | 4.18 (0.87) | .85             |
| 4. I understand and accept the need for vocational rehabilitation services.                                     | 4.20 (0.82) | .83             |
| 5. I recognize the benefits of participating in vocational rehabilitation activities.                           | 4.18 (0.83) | .82             |
| 6. I am determined to complete all the services identified in my individualized plan for employment.            | 4.20 (0.86) | .84             |
| 7. I get along with my rehabilitation counselor.  | 4.15 (0.88) | .81             |
| 8. I am actively involved in planning of my rehabilitation program with my counselor.                           | 4.05 (0.89) | .84             |
| 9. I am open to suggestions and feedback.   | 4.25 (0.77) | .85             |
| Mean score  | 4.10 (0.74) |                 |
| Eigenvalue  |             | 6.07            |
| % variance  |             | 67.39%          |
| Cumulative % variance   |             | 67.39%          |

Note. VRES = Vocational Rehabilitation Engagement Scale.

Utah, and Wisconsin. Administrators of state VR programs across the nation were approached to take part in the study, but data were only collected from the above states whose administrators agreed to allow recruitment of consumers served in their respective states. Forty-three percent of the participants were White, 10% Black, 41% Hispanic, 4% American Indian or Alaska Native, and 1% Asian; 61% were women; and 24% were married or co-habiting. Forty-three percent of participants had physical and sensory disabilities, 35% had mental health disabilities, and 22% had developmental disabilities. Seventeen percent of the participants had less than high school education, 23% were high school graduates, and 60% had at least some postsecondary education. Twenty-one percent of the participants were of transition age (aged 16 to 24), 67% were of prime age for employment (aged 25 to 54), and 10% were older workers (aged 55 to 70). One-hundred thirty-eight participants were randomly assigned for exploratory factor analysis (EFA), and the remaining sample ( $n = 139$ ) was used for confirmatory factor analysis (CFA).

## Measures

**VRES.** The VRES was developed by researchers in the Rehabilitation Research and Training Center on Evidence-Based Practice in VR (RRTC-EBP VR). Psychometric validation of the VRES was the primary focus of the present study. *Vocational Rehabilitation Engagement Scale* items were developed based on a comprehensive review of the client engagement literature and related patient engagement scales in medical rehabilitation. Items were written to include cognitive (e.g., “I understand and accept the need

for vocational rehabilitation services”), affective (e.g., “I am determined to complete all the services identified in my individualized plan for employment”), and behavior (e.g., “I communicate with my rehabilitation counselor regularly”) engagement (see Table 1). The draft of VRES items was reviewed by 12 rehabilitation counselor educators and VR researchers who have published extensively in the areas of rehabilitation assessment, program evaluation, client engagement, working alliance, and VR. Based on the recommendations of the expert panel, five items were deleted and some VRES items were revised for clarity and style. The instrument is comprised of 9 items. Each item was rated on a 5-point Likert-type rating scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores are calculated by summing the items. Responses at the higher end of the scale indicate a higher level of engagement in VR services.

**Working Alliance Inventory (WAI).** Participants’ working alliance with VR counselors was measured by the WAI (Horvath & Greenberg, 1989). WAI includes 36 items and three subscales representing three dimensions of working alliance: (a) bonds, (b) goals, and (c) tasks. The items are rated on a 7-point Likert-type agreement and disagreement scale. The questionnaire can be administered to both clients and therapists. High internal consistency reliability estimates were reported for both the client (Cronbach’s  $\alpha = .93$ ) and therapist (Cronbach’s  $\alpha = .87$ ) forms. Rational (i.e., expert opinions) and empirical (i.e., multitrait-multimethod) methods supported the content validity of the scale. Tracey and Kokotovic (1989) developed the WAI-S, 12-item version of WAI, using the items most indicative of the three

factors. A high internal consistency reliability estimate (Cronbach's  $\alpha = .95$ ) was reported for the WAI-S. For the purpose of this study, the client form of WAI-S was used with minor modifications to reflect VR settings. The WAI-S had a Cronbach's alpha of .93 in this study.

**Vocational Self-Efficacy Scale (VSES).** Participants' vocational self-efficacy was measured by VSES. The VSES was abbreviated from the *Life Skills Inventory* (LSI) that assesses life skills essential for assertive community living and work (F. Chan, Rubin, Lee, & Pruett, 2003). The scale includes 24 items (e.g., "I know how to prepare for a job that is of interest to me") that measures confidence in performing work-related activities. Each item is rated on a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). A high internal consistency reliability estimate (Cronbach's  $\alpha = .94$ ) was reported for the VSES (Fitzgerald, 2014). The VSES had a Cronbach's alpha of .96 in this study.

**Vocational Rehabilitation Internal Motivation Scale (VRIMS).** Participants' internal motivation to engage in VR practices was measured by VRIMS. This scale was developed by researchers in the RRTC-EBP VR. The VRIMS consists of three items (e.g., "I choose to receive vocational rehabilitation services because it is an opportunity for change") that are rated on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The VRIMS had a Cronbach's alpha of .80 in this study.

**Positive Vocational Expectancy Survey (PVES).** The expected benefits from completing services provided by state VR agencies were measured by PVES. The PVES requires that participants rate their level of agreement on 12 statements that completed the sentence, "Completing my vocational rehabilitation program will likely allow me to"; one example of an item reflecting a positive outcome was, "have a job with good pay and benefits." Each item is rated using a 5-point Likert-type agreement scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha for the PVES was reported to be .79 (Fitzgerald, 2014). The PVES had a Cronbach's alpha of .96 in this study.

**World Health Organization Disability Assessment Schedule-2.0 (WHODAS-2.0).** The WHODAS-2.0 was developed by researchers in the World Health Organization to assess health status and functional disability across different cultures and settings (Üstün, Kostanjsek, Chatterji, & Rehm, 2010). Respondents are asked to indicate difficulty experienced in performing daily activities. The 36-item version of the scale measures six domains; the 12-item version used in this study incorporates the two most significant items from each domain (Understanding and communicating, Items 3 and 6; Getting around, Items 1 and 7; Self-care, Items 8 and 9; Getting along with people, Items 10 and 11; Life activities,

Items 2 and 12; Participation in society, Items 4 and 5). Respondents rate the magnitude of the disability during the previous 30 days using a 5-point rating scale ranging from 1 (*none*) to 5 (*extreme/cannot do*). The 12-item WHO-DAS-2.0 can be used to gauge overall functioning, and this short version of the WHODAS-2.0 has been found to account for 81% of the variance in the full scale (Üstün et al., 2010). The test-retest reliability of the 12-item WHO-DAS-2.0 was reported to range from .93 to .96 at the domain level and .98 overall. The Cronbach's alpha values were reported to range from .94 to .96 at the domain level and .98 overall (Üstün et al., 2010). The WHODAS-2.0 had a Cronbach's alpha of .87 in this study.

## Procedure

Recruitment flyers were posted in the field offices of state VR agencies in eight states and distributed to rehabilitation counselors working in those offices. The flyer offered an inducement of a US\$15 gift card to a major retailer for completing the study materials. After reviewing the flyer, participants either met with a researcher located on-site at the state VR office or sent an email to the study authors indicating their interest in participating in the study. Participants were eligible to participate if they had been found eligible to receive services by the state VR program and had not been closed from services at the time of the study. Participants were provided the study consent materials and were asked to complete the survey online or in person. Participants were provided a weblink to an online system that required them to review the consent document and indicate their agreement to participate. The online system provided the survey questions over several pages to limit the amount of scrolling required to view all the questions on a particular page. A majority of surveys were completed through the online system using a computer workstation provided by the research team or on participants' personal computers. Some individuals requested that the survey be completed in person using paper-and-pencil format. In-person surveys ( $n = 14$ ) were administered by graduate students involved in the project in paper-and-pencil format, and the data were subsequently entered into the online system.

## Results

### EFA

A  $9 \times 9$  correlation matrix of the VRES was subjected to a principal component analysis (PCA). The Kaiser-Meyer-Olkin (Kaiser, 1970) measure of sampling adequacy (.90) exceeded the acceptable cutoff level of .50. The Bartlett's (1950) test of sphericity was significant,  $\chi^2(36, n = 138) = 1013.00, p < .001$ . Both of the appropriateness tests indicated the correlation matrix was suitable for factor analysis. The results of the PCA using Kaiser-Guttman's "eigenvalues

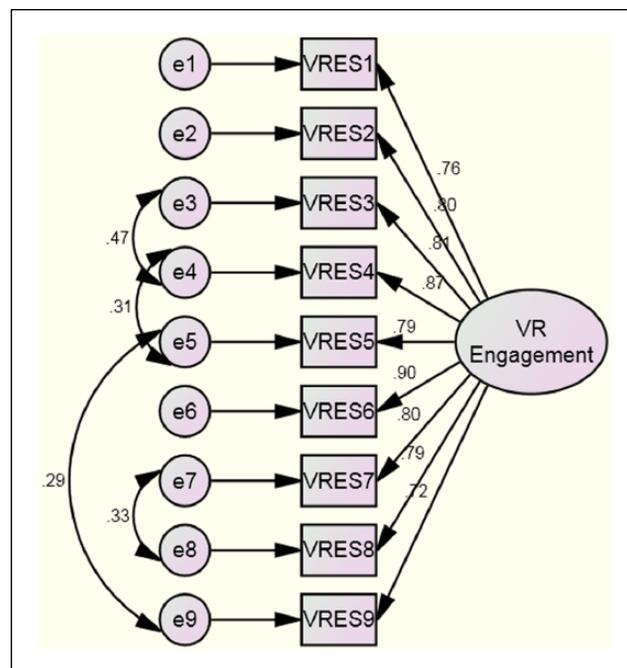
greater than one” criterion (Kaiser, 1960) indicated a one-factor model. The Cattell’s scree test (Nunnally & Bernstein, 1994) resulted in an “elbow” at the second factor also indicating a one-factor model as well. The one-factor measurement model explained 67% of the total variance, with factor loadings ranging from .76 to .85. Means and standard deviations for each of the items on the VR engagement scale, factor loadings, eigenvalues, and percentage of variance explained are presented in Table 1.

The one-factor model specified VR engagement as a single construct for VR clients. Although the items of the scale captured different aspects of VR engagement and uniquely contributed to characteristics of the construct, they largely represented an overarching framework of VR engagement. This finding is consistent with previous research in patient engagement (Hibbard et al., 2004; Kortte et al., 2007; Lequerica et al., 2006; O’Brien et al., 2009) indicating VR engagement is a unidimensional construct. In this study, VR engagement was constructed by the following components: recognizing benefits of VR services, communicating and working with counselors, involvement in planning for rehabilitation programs, being determined and actively striving to complete VR assignments and services, and having an open attitude toward the VR process.

## CFA

Because EFA is an exploratory data-driven process that includes subjective decision making, CFA was integrated into the factor analytic approach to cross-validate the factorial structure of the VRES (van Prooijen & van der Kloot, 2001). A CFA was conducted to cross-validate the dimensionality of the VRES using the SPSS AMOS statistical program (SPSS, 2009). The chi-square value traditionally has been used to evaluate overall model fit, with a non-significant chi-square indicating a good model fit. However, because the chi-square statistic is sensitive to sample size, it will nearly always reject the model when large samples are used (Hooper, Coughlan, & Mullen, 2008). As a result, several model-fit indices have been proposed as alternative to the chi-square statistics to assess model fit, including the following: (a) a relative chi-square ( $\chi^2 / df$ ) in the range of 3 to 1, comparative fit index (CFI) greater than .95, and (c) a root mean square error of approximation (RMSEA) less than 0.08 (Byrne, 2001; Hu & Bentler, 1999; Weston, Gore, Chan, & Catalano, 2008).

The CFA results for the one-factor model indicated the model is less than a good fit:  $\chi^2(27, n = 139) = 105.59, p < .001; \chi^2 / df = 3.91; CFI = .93; RMSEA = 0.15, 90\% CI = [0.12, 0.18]$ . Although the CFI was in the acceptable range, the relative chi-square ( $\chi^2 / df$ ) and RMSEA were above the conventional cutoff levels. Examination of modification indices revealed several pairs of error terms if correlated would reduce the chi-square value considerably. There are many ways that items can be dependent. For example, correlated errors are possible among items using similar wordings or



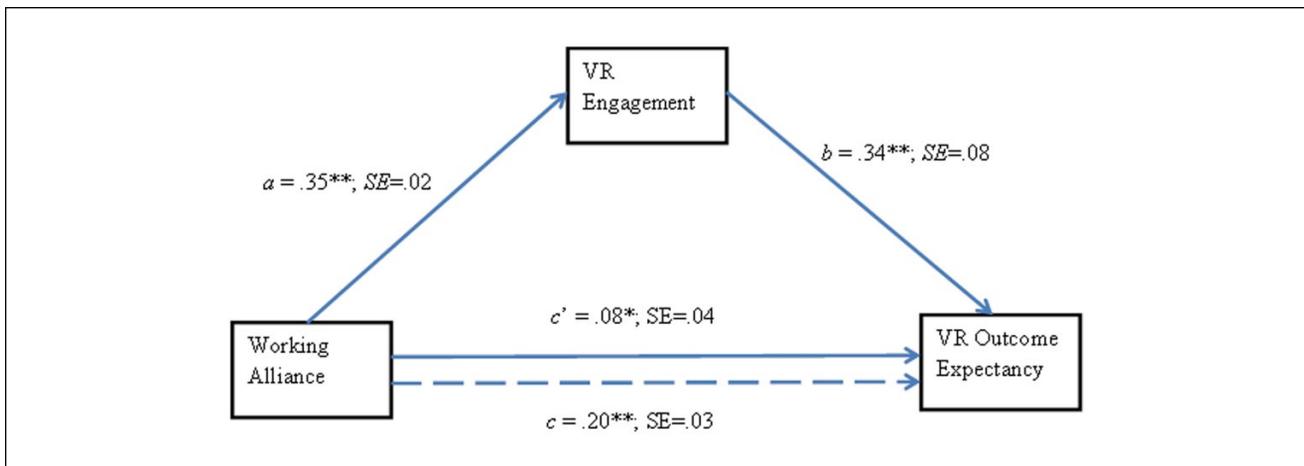
**Figure 1.** One-factor model for the VRES.

Note. VRES = Vocational Rehabilitation Engagement Scale.

appearing near to each other on the questionnaire (Bollen & Lennox, 1991). Correlating error terms is generally allowed if the correlations are not high and the addition of correlated errors do not change the remaining parameter estimates. Four pairs of error terms were correlated: (a)  $e7$  (“I get along with my rehabilitation counselor”) with  $e8$  (“I am actively involved in planning of my rehabilitation program with my counselor”), (b)  $e5$  (“I recognize the benefits of participating in vocational rehabilitation activities”) with  $e9$  (“I am open to suggestions and feedback”), (c)  $e3$  (“I show up for appointments related to my rehabilitation program”) with  $e4$  (“I understand and accept the need for vocational rehabilitation services”), and (d)  $e4$  with  $e5$ . After correlating the error terms, all of the fit indices, with the exception of the chi-square statistics, indicated a good fit for the one-factor measurement model:  $\chi^2(23, n = 139) = 38.23, p = .024; \chi^2 / df = 1.66; CFI = .99; RMSEA = 0.069, 90\% CI = [0.03, 0.11]$ . The one-factor measurement model for the VRES is depicted in Figure 1. All of the items had factor loadings .72 or above. Overall, the results indicate that a one-factor model is a good fit between the model and the data.

## Descriptive Statistics

Results showed a mean score of 4.10 ( $SD = 0.74$ ) for the VRES, indicating the participants were in general engaged in VR services. Although men ( $M = 4.19, SD = 0.62$ ) had higher engagement scores than women ( $M = 4.04, SD = 0.80$ ), the difference was not statistically significant,  $t(267) = 1.59, p = .11$ . An analysis of variance (ANOVA) indicated



**Figure 2.** Path coefficients for simple mediation analysis on VR outcome expectancy ( $N = 277$ ).

Note. Dotted line denotes the effect of working alliance on VR outcome expectancy when VR engagement is not included as a mediator.  $a$ ,  $b$ ,  $c$  and  $c'$  are standardized ordinary least squares regression coefficients. VR = vocational rehabilitation.

\* $p < .05$ . \*\* $p < .01$ .

neither disability type nor education level was significantly associated with VR engagement,  $F(2, 274) = 0.78, p = .46$ ;  $F(2, 274) = 1.43, p = .24$ , respectively. However, age had a significant association with VR engagement scores,  $F(2, 274) = 3.76, p < .05$ . Post hoc analysis using Bonferroni correction for significance indicated that participants who were in the prime age for employment group (ages 25–54;  $M = 4.15, SD = 0.72$ ) had significantly higher engagement scores than the transition-age youth group ( $M = 3.88, SD = 0.82$ ).

### Reliability

Reliability of the VRES was assessed by the Cronbach's alpha. The VRES had a Cronbach's alpha of .94 indicating that the scale is capable of producing internally consistent scores.

### Validity Studies

Convergent validity of the VRES was examined by correlating the VR engagement with working alliance, vocational self-efficacy, internal motivation, and VR outcome expectancy scales. The results indicated working alliance ( $r = .67, p < .001$ ), internal motivation ( $r = .53, p < .001$ ), vocational self-efficacy ( $r = .42, p < .01$ ), and VR outcome expectancy ( $r = .41, p < .01$ ) were significantly associated with VR engagement, with relatively large effect sizes. Because rehabilitation research has indicated that severity of disability alone usually does not always affect the motivation of clients to engage in treatment (Ottomanelli & Lind, 2009; Shahnasarian, 2014), divergent validity of the VRES was examined by correlating VR engagement scores with functional disability using WHODAS scores. Functional disability was not significantly associated with VR engagement ( $r = -.03, p = .62$ ). Overall, the correlations between the

scales were in the expected directions supporting the convergent and divergent validity of the VRES.

Although the relationship between working alliance and VR engagement were relatively high, the two constructs are conceptually distinct. As a result, we examined the unique proportion of variance in outcome expectancy accounted for by VR engagement after controlling for the variance in working alliance. In a hierarchical multiple regression, working alliance scores were entered in the first step, followed by the VR engagement scores. In the first step of the regression analysis, WAI scores ( $\beta = .36, p < .001$ ) accounted for a significant amount of variance in outcome expectation scores:  $R = .36, R^2 = .13, F(1, 275) = 39.79, p < .001$ . In the second step, VR engagement was entered. VR engagement accounted for a significant amount of variance in outcome expectancy scores beyond that explained by the working alliance variable entered in the first step:  $R = .44, R^2 = .19, \Delta R^2 = .07, F(1, 274) = 21.93, p < .001$ . An examination of the standardized partial regression coefficients revealed that working alliance was no longer significant after controlling for the effect of VR engagement ( $\beta = .14, p = .06$ ). Conversely, VR engagement was significant after controlling for the effect of working alliance ( $\beta = .34, p < .001$ ). Thus, VR engagement did account for a unique proportion of the variance in outcome expectancy. It is also a mediator that can be used to explain the relationship between working alliance and outcome expectancy (see Figure 2).

### Discussion

Despite the fact that state VR agencies provide numerous supports, resources, and benefits to people with disabilities, motivation of VR clients to participate in employment-focused rehabilitation services is a widespread concern

(Härkäpää, Järvikoski, & Gould, 2014). The lack of engagement in VR services is not well understood. Examining this question has been complicated by the lack of an instrument capable of measuring engagement in employment-focused services. Rehabilitation researchers and practitioners have had to rely on instruments designed to measure engagement in other settings in attempts to evaluate VR engagement, yet none incorporate items related to attendance, participation, and efforts in working toward mutually established VR goals, which are considered instrumental to successful employment outcomes. Therefore, the purpose of this study was to develop and validate a brief instrument to measure VR engagement for clients with disabilities.

The VRES is a nine-item, unidimensional scale. The VRES is similar to the HRERS (Lequerica et al., 2006) and the PAM (Hibbard et al., 2004) in terms of its unidimensionality, yet different from the SOLES (O'Brien et al., 2009), which is multi-dimensional with a two-factor structure. A benefit of a unidimensional scale, such as the VRES, is that it suggests the concept (i.e., VR engagement) is relatively straightforward in interpretation in research and practice (i.e., VR clients either engage more or less in VR treatment and services). Therefore, the VRES is useful at indicating the VR engagement of clients and focusing rehabilitation efforts on either maintaining or increasing VR engagement.

Several demographic variables were investigated regarding their relationship with VR engagement. Age was significantly associated with scores on the VRES. Persons at prime age for employment (i.e., 25 to 54) were found to have higher VR engagement than transition-age individuals (i.e., 16 to 24). This finding was not unexpected as it makes sense that individuals of prime working age would be more committed and engaged with their VR interventions and services. As individuals of transition age reported lower levels of VR engagement, interventions aimed at increasing self-determined motivation and VR engagement may represent a potential area for improving postsecondary education intervention and employment outcomes for this population. In the investigation of other demographic variables, neither disability type nor education level was significantly associated with VR engagement. The finding that VR clients in this study did not differ in engagement as a function of disability type or educational background reflects that engagement is strongly influenced by self-determined motivation and independent of factors associated with eligibility determination or other factors associated with employment as a result of services (Dutta, Gervey, Chan, Chou, & Ditchman, 2008).

The examination of the external correlates provided evidence for convergent and divergent validity. A strong association, found between internal motivation and VR engagement, is consistent with previous results (Kennedy & Gregoire, 2009; McBride et al., 2010; Russell & Bray, 2010; Saeb et al., 2013; Vancampfort et al., 2013; Wild et al., 2006;

Williams et al., 2004) which demonstrate that internal motivation, or self-determined motivation affects client engagement. Ryan and Deci (2000) suggested that motivation to engage is often facilitated by environments that support client autonomy, competence, and relatedness. Working alliance was strongly associated with VR engagement and aligned with previous research (Barber et al., 2001; Ryan & Deci, 2000); working alliance, or relatedness, affects engagement. Self-efficacy was moderately associated with VR engagement in this study, which is consistent with previous research (Lorig et al., 1996; Ryan & Deci, 2000; Wallston et al., 1994); self-efficacy, or competence, affects engagement. Finally, outcome expectancy was also moderately associated with VR engagement in this study and consistent with previous social-cognitive career theory research (Cardoso et al., 2013; Dearing, Barrick, Dermen, & Walitzer, 2005). The finding that VR engagement is associated with internal motivation, working alliance, self-efficacy, and outcome expectancy indicates that it aligns well with the SDT framework (Deci & Ryan, 1985). With regard to divergent validity, functional disability was not associated with VR engagement. These findings support the conclusion that severity of health or disability status is unrelated to VR engagement and should not be considered a risk factor related to motivation of people with disabilities for VR services.

### *Limitations*

Several limitations in the present study exist and should be taken into consideration in interpretation and utilization of the findings. The VRES is a self-report measure and thus relies on self-report data, making the results vulnerable to “affective bias, poor insight, and recent life events” (Atkinson, Zibin, & Chuang, 1997, p. 99) and subject to “anchoring effects, primacy and recency effects, time pressure, and consistency motivation” (Paulhus & Vazire, 2009, p. 228). Another potential limitation is that sample participants included individuals with mental health disabilities as well as those with developmental disabilities who may experience cognitive dysfunction (Martinez-Arán et al., 2004), which may adversely affect the reliability or validity of survey responses. Finally, some of the data were gathered at VR agencies from clients by on-site researchers; it may be that VR clients responded more positively to in-person completion of study materials (i.e., indicated greater engagement) due to social desirability response bias—a tendency to respond in a manner that will be viewed favorably by others (D. Chan, 2009).

### *Implications for Rehabilitation Counseling Practice and Research*

Staying involved and engaged in rehabilitation services is consistently linked to a higher likelihood of goal attainment,

leading to better outcomes and improved treatment satisfaction (Hibbard & Greene, 2013; Hibbard et al., 2004; Wild et al., 2006). Findings from the present study indicate that VR engagement was correlated with SDT variables, such as internal motivation, working alliance, self-efficacy, and outcome expectancy. This suggests that fostering the fundamental human tendency toward self-growth and vitality may enhance engagement in employment-focused rehabilitation services, which, in turn, may help to improve employment outcomes for people with disabilities. By using the VRES to identify VR clients with lower levels of engagement, counseling interventions can focus on increasing motivation through improving self-determination to achieve subsequent behavior change in VR services. For example, the EBP of motivational interviewing (MI) has been used to increase employment motivation (Larson, 2008) and could be further enhanced to promote VR engagement. Specifically, MI can be conceptualized and informed by SDT (Foote et al., 1999; Ginsburg, Mann, Rotgers, & Weekes, 2002), and several studies on MI interventions have started to include SDT measures (e.g., Resnicow, Jackson, & Blissett, 2005; Rubak, Sandbaek, Lauritzen, Borch-Johnsen, & Christensen, 2009). In future rehabilitation counseling practice and research, the VRES could serve as an outcome measure for MI approaches aimed at increasing self-determined work motivation in VR settings.

The VRES is a brief scale and includes items related to cognitive engagement, emotional engagement, and behavioral engagement. Future studies should investigate whether an expanded version of the VRES scale is warranted to adequately capture the main components of engagement. Further research would also be beneficial to determine the appropriateness of the VRES with specific disabilities (e.g., traumatic brain injury, epilepsy) and in other state VR agencies (e.g., California, New York) not sampled in our study. In addition, cultural and linguistic translation and validation would be beneficial for use when working with VR clients whose primary language is not English.

## Conclusion

Motivational issues or a “lack of engagement” with rehabilitation activities in VR settings contributes to isolation, boredom, and inactivity among people with disabilities, and, ultimately, limits gains in stay-at-work or return-to-work and overall health-related quality of life outcomes (Coulter, 2012; Hibbard & Greene, 2013). There is wide agreement that client engagement should be considered a quality indicator for health care and rehabilitation services, as researchers, practitioners, and policy makers are emphasizing the intermediate treatment outcome of engagement to contain costs and improve intervention efficacy (Prendergast et al., 2002; Simpson, 2004). Thus, an instrument that can assess VR client engagement, such as the VRES, is essential

in providing rehabilitation services of optimal benefit to clients. In this current study, we validated a unidimensional VR engagement measure that can be used to accurately assess clients’ engagement in rehabilitative services. This measure is brief and psychometrically sound. It can be used by both rehabilitation counselors and researchers to assess and better understand VR engagement, as well as to evaluate the effectiveness of MI and other counseling approaches in state VR service delivery practices.

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