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Abstract

This program evaluation project evaluated the validity of a hypothesized model for predicting fieldwork performance using data of 121 occupational therapy students from a single university. The first aim was to evaluate the hypothesized relationships between observed measures (e.g., admission GPAs) and proposed latent factors (e.g., academic achievement) for predictor and outcome variables. Factor analysis of the outcome variable revealed a three-factor structure, measured by 13 items from the Fieldwork Performance Evaluation for the Occupational Therapy Student. However, factor analyses of the predictor variables did not support the proposed latent factors: Academic Achievement and Professional Potential. The second aim was to evaluate the hypothesized effects of predictor variables on level II fieldwork performance. Results of the structural equation modeling (SEM) analysis supported some of the hypothesized relationships. The model was a good fit to the data; however, the final SEM model only accounted for 16.4% of the variance. Results showed that four of the eight observed variables were predictive. Two academic measures (i.e., admission overall GPA and science GPA) and two non-academic measures (i.e., Myer's Briggs Thinking type indicator and number of observation hours) demonstrated small predictive relationships with Evaluation Skills. Admission overall GPA and thinking type indicator had positive predictive relationships; whereas, admission science GPA and number of hours had inverse relationships. None of the observed variables predicted the other two fieldwork performance factors: Professional Behaviors and Intervention Skills. Although the results of this project did not fully support the hypothesized model, some interesting findings emerged for future exploration.

Keywords

Fieldwork, predictor model, structural equation modeling, clinical performance, occupational therapy students

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ABSTRACT

This program evaluation project evaluated the validity of a hypothesized model for predicting fieldwork performance using data of 121 occupational therapy students from a single university. The first aim was to evaluate the hypothesized relationships between observed measures (e.g., admission GPAs) and proposed latent factors (e.g., academic achievement) for predictor and outcome variables. Factor analysis of the outcome variable revealed a three-factor structure, measured by 13 items from the Fieldwork Performance Evaluation for the Occupational Therapy Student. However, factor analyses of the predictor variables did not support the proposed latent factors: Academic Achievement and Professional Potential. The second aim was to evaluate the hypothesized effects of predictor variables on level II fieldwork performance. Results of the structural equation modeling (SEM) analysis supported some of the hypothesized relationships. The model was a good fit to the data; however, the final SEM model only accounted for 16.4% of the variance. Results showed that four of the eight observed variables were predictive. Two academic measures (i.e., admission overall GPA and science GPA) and two non-academic measures (i.e., Myer's Briggs Thinking type indicator and number of observation hours) demonstrated small predictive relationships with Evaluation Skills. Admission overall GPA and thinking type indicator had positive predictive relationships; whereas, admission science GPA and number of hours had inverse relationships. None of the observed variables predicted the other two fieldwork performance factors: Professional Behaviors and Intervention Skills. Although the results of this project did not fully support the hypothesized model, some interesting findings emerged for future exploration.

BACKGROUND

Similar to other occupational therapy (OT) programs, a master's level OT program in the southwestern region of the United States seeks to select the best applicants each year. As the number of applicants increases each year, this program has examined admission data and processes to determine the most effective methods for selecting the best candidates. Optimal program candidates are described as those who successfully complete didactic course work, fieldwork experiences, pass the national certification examination, and ultimately provide high quality OT services. Improved understanding of the pre-program predictive factors can be used to inform admission criteria. Additionally, an improved understanding of predictive factors that occur early in the program can provide valuable information for student advising and ongoing curricula evaluation.

Overall Program Performance

The literature provides some guidance about which factors predict the overall performance of students in OT programs. Criteria commonly used in admission processes that have been shown to predict overall program performance include pre-program grade point average (GPA; Lysaght, Donnelly, & Villeneuve, 2009; Kirchner & Holm, 1997; Kirchner, Stone, & Holm, 2001) and Graduate Record Examination (GRE) scores (Kirchner & Holm, 1997; Kirchner et al., 2001). Whereas, other admission variables have been shown to lack the ability to predict overall program performance. These variables include personal essays or letter of intent (Lysaght et al., 2009; Kirchner et al., 2001), interviews (Lysaght et al., 2009), and letters of reference (Kirchner & Holm, 1997).

Clinical Performance

The literature provides limited evidence about the capacity of admission criteria to predict the clinical performance of OT students. The GRE has demonstrated some predictive capacity. Bathje, Ozelie, and Deavila (2014) identified the written sub-scale of the GRE to be a predictor of clinical performance but not analytical and qualitative scores. Another study found a positive correlation between the analytical sub-scale GRE scores and fieldwork ratings; however, results of the regression analysis were not statistically significant (Kirchner et al., 2001).

Other literature has examined OT program achievement, emotional/personality attributes, and student demographics with regards to predicting clinical performance. Two studies found that higher academic achievement during the OT program predicted higher fieldwork ratings (Howard & Jerosch-Herold, 2000; Tan, Meredith, & McKenna, 2004). Emotional intelligence and communication attributes have been shown to be significantly correlated with certain aspects of fieldwork performance (Andonian, 2013; Brown, Williams, & Etherington, 2016; Tan et al., 2004; Tickle-Degnen, 1998).

In summary, the literature provides limited evidence regarding which factors predict the successful overall program and fieldwork performance of OT students. Most of the studies used regression analysis to examine the relationship between predictor variables and outcomes. The use of other multivariate analysis methods, such as

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structural equation modeling (SEM), have been suggested in healthcare education research to verify cognitive and non-cognitive factors as predictors for student success (Violato & Hecker, 2007). An advantage of SEM is the simultaneous analysis of all variables in the model (Beran & Violato, 2010). The model can include multiple predictor and outcome variables as well as the use of both observed and latent variables. A latent variable (or factor) represents a construct that is measured by two or more observed variables (e.g., professional potential).

This paper presents the results of a program evaluation project that evaluated the validity of a hypothesized predictor model for identifying students at risk for poor fieldwork performance. The purpose of this program evaluation project was to evaluate the validity of a hypothesized model for identifying those students at risk for poor fieldwork performance. Specific aims included: (1) to evaluate the hypothesized relationships between observed variables (e.g., admission GPA) and proposed latent factors (e.g., academic achievement) for both predictor and outcome variables; and (2) to evaluate the hypothesized effects of predictors (i.e., academic achievement, professional potential, competency exam performance) on Level II fieldwork performance.

METHODS

This project involved a retrospective analysis of pre-program and program data of 131 OT students at a Master of Occupational Therapy (MOT) program in the southwest region of the United States. The study was reviewed by the university's research integrity office and determined as exempt from institutional board approval due to the program evaluation scope of the project. Data were collected from the records of four cohorts of students who completed the MOT program between 2008 and 2011. This timeframe was selected because the admission criteria for these four cohorts were identical which allowed for a large sample size for analysis. De-identification of the collected data ensured confidentiality and anonymity of the students' information. The data set contained records of 115 female students (88%) and 16 male students (12%). With regards to race and ethnicity, 103 (79%) were white; 17 (13%) were Hispanic, 8 (6%) were black, and 3 (2%) were identified as other. Twenty-eight (21%) of the students had a bachelor's degree prior to beginning the MOT program and 103 (79%) did not. The mean overall admission GPA was 3.35 with a standard deviation of .34. The mean admission science GPA was 3.21 with a standard deviation of .52. Nine student records were dropped prior to subsequent analyses because the records contained missing data; the final data set contained 122 student records.

The final data set included information from pre-program and program data that constituted the variables used to construct and evaluate the hypothesized predictor model. The following sections provide descriptions of the predictor variables and outcome variables in the hypothesized model.

Hypothesized Predictor Model

As part of a program evaluation project, the first author developed a hypothesized model for predicting students who were at risk for failing a Level II fieldwork. This model

included the following as predictor variables: pre-admission variables (e.g., cumulative GPA), early-program variables (e.g., first semester OT course grade), and a mid-program mediator variable (i.e., competency exam) as predictor variables. The outcome variable was Level II fieldwork performance as measured by the Fieldwork Performance Evaluation for the Occupational Therapy Student (FWPE; American Occupational Therapy Association, 2002). Figure 1 presents the hypothesized predictor model which includes proposed latent factors for predictor and outcome variables. The ovals represent the proposed latent factors and the rectangles represent observed variables. Straight arrows present the hypothesized relationship of observed variables (e.g., admission GPA) on latent factors (e.g., academic achievement) as well as the hypothesized effects of predictors on the outcome variables (e.g., Factor 1, FWPE items) related to fieldwork performance.

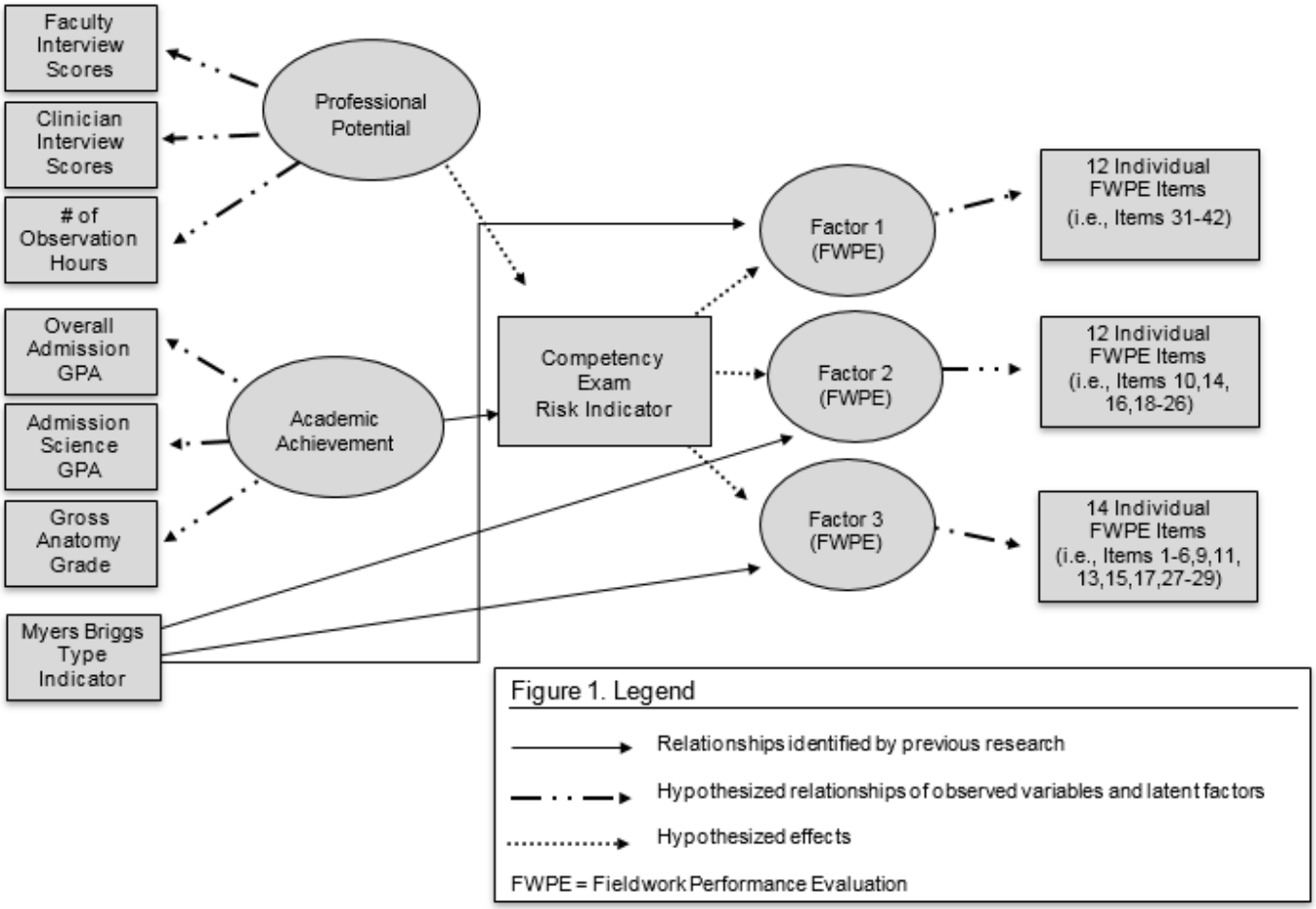

Figure 1. Initial hypothesized model. Diagram illustrates the initial hypothesized model that includes all items and the proposed relationships. GPA = Grade Point Average; Factor 1 = Professional Behaviors; Factor 2 = Clinical Reasoning/Skills; Factor 3 = Communication and Responsibility; FWPE = Fieldwork Performance Evaluation form items

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Predictor Variables

Pre-program data and program data comprised the predictor variables that were specified in the hypothesized model. Variables were selected that had some supporting evidence from the literature as being potential predictors of successful fieldwork performance. The hypothesized model included proposed latent factors, observed variables, and a mediator variable. A latent factor is a variable that is inferred from other observed (or directly measured) variables. A mediator variable is a variable that underlies the relationship between a predictor variable(s) and an outcome variable. The following paragraphs present a description of the different variables within the model.

Latent factors. The first proposed latent factor specified in the hypothesized model was labeled *Professional Potential*. Three observed variables were identified for the measurement of professional potential. These variables were obtained as part of the MOT program's admission process and included: (a) faculty's score for student's pre-admission interview (measured on a 10 point scale), (b) clinician's score for student's pre-admission interview (measured on a 10 point scale), and (c) an ordinal rating scale of the number of OT observation hours prior to being admitted to program (i.e., 1 = 0-59 hours, 2 = 60-90 hours, 3 = 91-150 hours, 4 = 151-236 hours, 5 = 237 or more hours).

The second proposed latent factor specified in the hypothesized model was labeled *Academic Achievement*. Three observed variables were identified for the measurement of academic achievement. These variables included: (a) overall GPA at admission as measured on a 4.0 scale (admission overall GPA), (b) GPA for prerequisite science courses as measured on a 4.0 scale (admission science GPA), and (c) final grade in a MOT gross anatomy course on a 100-point scale. This course was selected because it is an academically rigorous course taken in the first semester of the program.

Separate observed variable. The hypothesized model also included a separate observed variable, Myers-Briggs Type Indicator (MBTI; Myers & Briggs Foundation, n.d.). MBTI is a self-report questionnaire that identifies 16 type indicators. The measure consists of 93 items in which the person chooses a dichotomous response for each item. Each item is scored on one of the following four scales: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judgment-Perception. The result of the MBTI is one of 16 types. For example, the type ENFJ would indicate the following preferences: Extraversion (E), Intuition (N), Feeling (F), and Judgment (J). Capraro and Capraro's (2002) meta-analysis calculated the following means (with minimum and maximum reliability ratings in parentheses) for reliability coefficients reported in the literature: overall reliability, .82 (.48, .97); Cronbach's alpha, .82 (.55, .97); test-retest, .81 (.48, .91); E-I scale, .84 (.74, .95); S-N scale, .84 (.78, .97); T-F scale, .76 (.48, .97); and J-P scale, .82 (.63, .97). Health care providers have used the MBTI instrument to gain self-awareness; to determine the extent or significance of preferences; and to adjust communication and programs to suit the patients' needs (Myers & Briggs Foundation, n.d.). This MOT program has students complete the MBTI in the first semester of the program. Information about MBTI is applied in various courses within the curriculum.

Mediator variable. The hypothesized model also specified a mediator variable, competency exam risk indicator. The risk indicator is a three-level rating that indicates a students' level of risk for failing the national certification exam. This rating was based on the scores of one of two standardized competency exams that MOT students completed prior to final fieldwork assignments. The two standardized exams were the Occupational Therapy Knowledge Exam (OTKE) and the National Board for Certification in Occupational Therapy (NBCOT) 100 Question Practice Test. The program developed this risk indicator as a proxy variable so that data from the competency exams could be used for all students regardless of which competency exam the student had taken. The risk indicator was determined using medians and inter-quartile ranges of the student scores for the two competency exams. The respective medians and inter-quartile ranges were used to develop the risk indicator measure (i.e., three-point Likert rating scale). A rating of 1 (i.e., minimal risk) was assigned for a score of above 70 for the Occupational Therapy Knowledge Exam (OTKE) and a score of above 425 for NBCOT Practice Test. A rating of 2 (i.e., moderate risk) was assigned for a score between 62 and 70 for the OTKE and a score between 411 and 425 for the NBCOT Practice Test. Finally, a rating of 3 (i.e., high risk) was assigned for a score of 61 or below for the OTKE and a score of 410 or below for the NBCOT Practice Test.

Outcome Variables

The initial hypothesized model specified three latent factors of fieldwork performance as the outcome variables: *Professional Behaviors*; *Clinical Reasoning/Skills*; and *Communication and Responsibility*. These latent variables were derived through factor analysis methods using ratings from the FWPE completed by the first author. The FWPE is the standardized measure that is used by all OT programs in the United States to evaluate students' performance at the completion of level II fieldworks. The FWPE contains seven domains and is comprised of 42 items. The clinical supervisor rates the student's performance on each of the 42 items using a four-point Likert scale. The domains include: (a) fundamentals of practice; (b) basic tenets of occupational therapy; (c) evaluation and screening; (c) intervention; (d) management of OT services; (e) communication; and (f) professional behaviors. The derived latent factors were used as outcome variables in the structural equation model.

Data Analysis

Prior to the main analyses of the hypothesized model, descriptive statistics were calculated for all variables. The data were analyzed to test for any violations of normality (i.e., measures of skewness, kurtosis, multicollinearity) and any extreme values (i.e., outliers) in the data.

For the main analyses, a series of procedures were used to construct and evaluate the hypothesized model. First, exploratory factor analyses (EFA) were used to specify the latent factor structures within the hypothesized model. Specifically, separate EFAs were conducted to identify any latent factors that were supported by observed variables. The proposed predictor factors were *Academic Achievement* and *Professional Potential*. The latent outcome factors were derived from the FWPE items. SPSS version 19 was used to conduct the descriptive statistics and EFAs.

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Second, confirmatory factor analysis (CFA) was used to evaluate and re-specify the factor structures that were derived from the previous EFAs. CFA is a statistical procedure used to evaluate the interrelationships among latent factors and observed variables within a model (Brown, 2006). The use of multiple measures of goodness of fit is recommended to evaluate how the model fits the data (Hooper, Coughlan, & Mullen, 2008). The goodness of fit indices included: chi square, the comparative fit index (CFI), the Tucker Lewis index (TLI), and the root mean square of error approximation (RMSEA). Mplus version 6.11 was used to conduct CFA.

Third, structural equation modeling (SEM) was used to statistically test the re-specified, hypothesized model (i.e., the model that was re-specified as a result of the EFA and CFA processes). SEM is a multivariate method that simultaneously analyzes multiple variables (latent and observed) to determine if the data are compatible with the hypothesized model (Mulligan, 1998). For purposes of this project, SEM was used to determine if the measures of *Academic Achievement* and *Professional Potential* could predict which students were at risk for poor fieldwork performance. SEM evaluates the validity of a hypothesized model by determining the goodness of fit of the model to the data. If the fit is acceptable, the hypothesized relationships and effects are supported by the data, thereby supporting the validity of the model (Nachtigall, Kroehne, Funke, & Steyer, 2003; Brown, 2006). Like the prior CFA analysis, Mplus version 6.11 and the aforementioned goodness of fit measures were used for SEM analysis.

RESULTS

Descriptive Analysis

Results of the descriptive analyses revealed that skewness and kurtosis for the data distributions were within normal limits. Data were also examined for multicollinearity among the variables, and no correlations exceeded 0.80. With regards to multivariate outlier analyses, one case was identified as an outlier. This case had a Mahalanobis distance value greater than 20 and a standardized value greater than $\pm$1.96; therefore, it was dropped from further analyses which resulted in a final sample size of 121 cases.

Step One: EFA

Multiple EFAs were conducted to specify relationships among proposed latent factors and observed variables. In accordance with factor analysis procedures, proposed latent factors with corresponding observed variables for each EFA were identified. All three EFAs were conducted using principal axis factoring with oblique rotation (Promax) in SPSS. This method was selected because it is allows for greater correlation of factors (Brown, 2006).

EFAs for predictor variables. Two EFAs were conducted for each of the proposed latent predictor factors: *Professional Potential* and *Academic Achievement*. The results of the first EFA did not yield a factor structure for *Professional Potential* for any of the three specified, observed variables (i.e., faculty interview score, clinician interview score, observation hour range). Likewise, the EFA for *Academic Achievement* did not yield a factor structure for any of the three specified, observed variables (i.e., admission

overall admission GPA, admission science GPA, gross anatomy course grade). Because these EFAs did not reveal any factor structures, the latent predictor factors were removed from the hypothesized model. Instead, these six observed variables (i.e., faculty interview score, clinician interview score, observation hour range, admission overall GPA, admission science GPA, gross anatomy course grade) were considered as separate, observed variables in the re-specified model.

EFA for outcome variable. A third EFA was conducted to specify a factor structure for the outcome variable (i.e., fieldwork performance) using all 42 items from the FWPE as observed variables. The results of this EFA yielded a three-factor structure—a factor structure with three latent factors that were each measured by specific FWPE items. Only those FWPE items with an absolute value factor loading of greater than 0.4 were included for each factor. The determination of the three-factor structure was based on the criteria that each factor must have three or more salient loadings (i.e., factor loadings of FWPE items) with an absolute value greater than 0.4 to be considered a factor (Gorsuch, 1997). Table 1 presents the results of the final three-factor structure which accounted for 58.6% of the variance. Results of the EFA reduced the number of FWPE items used in subsequent analyses. Thirty-eight of the 42 FWPE items loaded on one of three factors, and four FWPE items did not load on any factor. Factor 1 was labeled *Professional Behaviors*. This factor had 12 items with factor loadings ranging from .69 to .86. Factor 2, *Clinical Reasoning/Skills,* also had 12 items with factor loadings ranging from .45 to .92. Factor 3, *Communication and Responsibility*, had 14 items with factor loadings ranging from .41 to .89.

Table 1

Factor Loadings after Exploratory Factor Analysis Using Oblique Rotation (Promax)

Observed Variable	F1	F2	F3
FWPE 40 Demonstrates time management	.855		
FWPE 36 Collaborates with supervisor	.834		
FWPE 37 Takes responsibility for professional competence	.828		
FWPE 41 Demo positive interpersonal skills	.823		
FWPE 38 Responds constructively to feedback	.803		
FWPE 39 Demo consistent work behaviors	.793		
FWPE 33 Produces clear documentation	.790		
FWPE 34 Written communication is legible	.746		
FWPE 31 Produces the volume of work	.745		
FWPE 42 Demonstrate respect for diversity	.739		

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Table 1 Continued			
Observed Variable	F1	F2	F3
FWPE 35 Uses language appropriate for recipient	.726		
FWPE 32 Communicates verbally and nonverbally	.693		
FWPE 22 Implements client-centered intervention plans		.921	
FWPE 21 Selects relevant occupations		.898	
FWPE 23 Implements occupation-based intervention plans		.736	
FWPE 20 Chooses occupations that motivate		.718	
FWPE 24 Modifies task approach occupation/environment		.625	
FWPE 18 Articulates a clear, logical rationale for intervention		.624	
FWPE 14 Adjusts/modifies the assessment procedures		.609	
FWPE 16 Establishes an accurate and appropriate plan		.581	
FWPE 19 Utilizes evidence from research and resources		.566	
FWPE 26 Documents the client's response		.447	
FWPE 25 Updates modifies or terminates intervention plan		.561	
FWPE 10 Determines client’s occupational profile		.447	
FWPE 5 Articulates value of occupation			.887
FWPE 6 Communicates roles of OT and OTA			.852
FWPE 4 Articulates values and beliefs			.762
FWPE 1 Adheres to ethics			.642
FWPE 3 Uses judgment and safety			.619
FWPE 2 Adheres to safety regulations			.566
FWPE 17 Documents the results of the evaluation			.533
FWPE 11 Assesses client factors and contexts			.516
FWPE 15 Interprets evaluation results			.514
FWPE 27 Demonstrates abilities to assign responsibilities			.512
FWPE 29 Demonstrates understanding of costs and funding			.422

Table 1 Continued			
Observed Variable	F1	F2	F3
FWPE 9 Selects relevant screening & assessment methods			.412
FWPE 28 Demonstrates ability to actively collaborate			.412
FWPE 13 Administers assessments			.408

Note. Factor 1 (F1), Professional Behaviors; Factor 2 (F2), Clinical reasoning/skills; Factor 3 (F3), Responsibility & Communication; FWPE = Fieldwork Performance Evaluation item

Step Two: CFA

CFA was conducted on the final EFA three-factor structure of the FWPE items to further specify the three-factor structure of fieldwork performance. CFA is a factor analysis method that analyzes the goodness of fit of the factor structure to the data. Multiple fit indices are used to determine how well the factor structure fits the data. A significant chi square statistic (χ^2) indicates a poor fit; whereas, an insignificant chi square indicates a good fit. A CFI or TLI value greater than .95 is considered a good fit; whereas, a RMSEA value of less than .06 is considered a good fit (Hu & Bentler, 1997).

The initial three-factor structure with the 38 FWPE items was a poor fit to the data, χ^2 (662) = 1,510.93, $p < .0001$, CFI = .76, RMSEA = .11, 90% CI [.10, .11]. Several steps were conducted to re-specify the factor structure until a good model fit was achieved, χ^2 (62) = 69.15, $p < .0001$, CFI = .99, RMSEA = .03, 90% CI [.00, .07]. The final CFA model retained 13 (31%) of the original 42 FWPE items which yielded a more parsimonious structure. Figure 2 presents a diagram of the three-factor structure with the associated FWPE items that were retained in the final CFA model.

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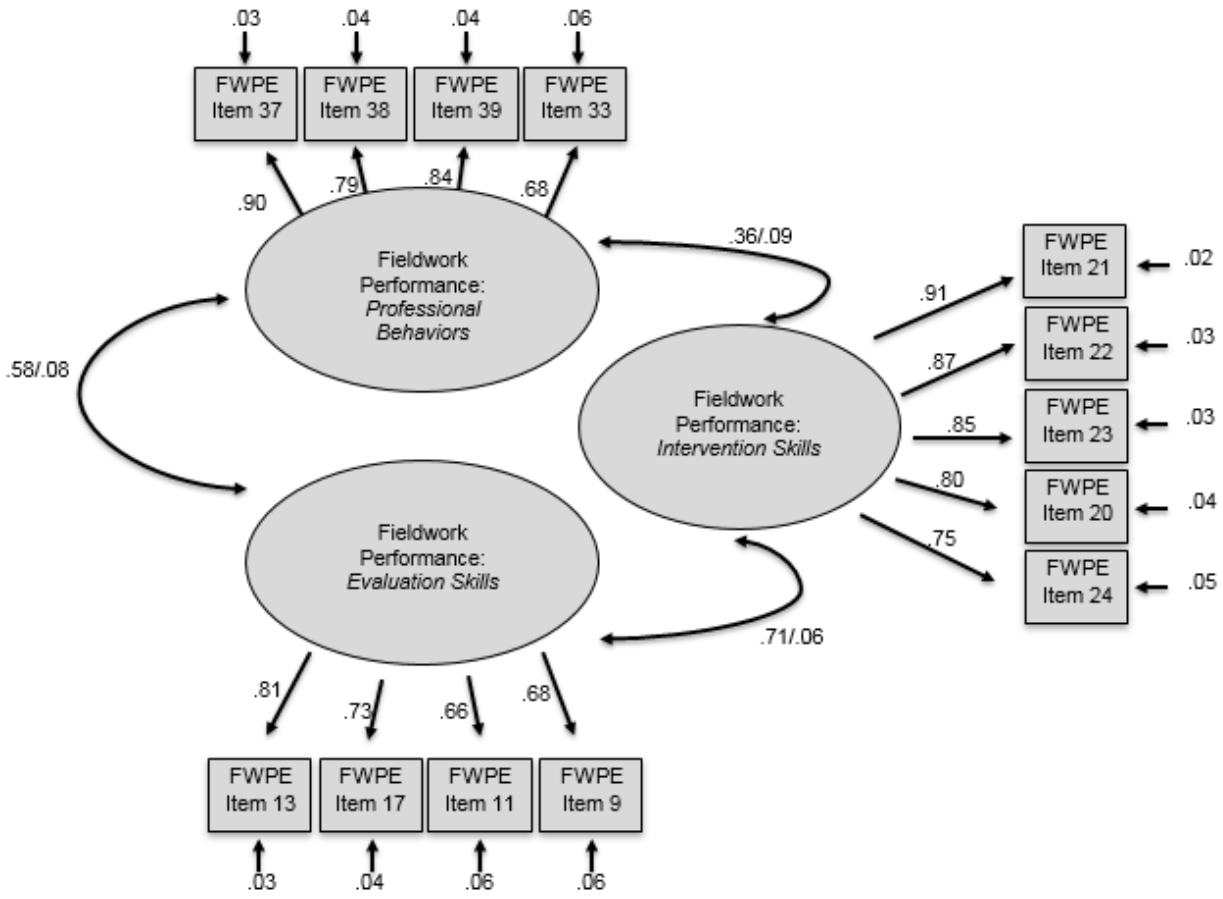

Figure 2. Final CFA solution. Diagram illustrates the simple three-factor structure following confirmatory factor analysis with standardized maximum likelihood parameter estimates and error variances for each observed variable (see straight arrows to FWPE items). Correlation coefficients for correlated latent factors are provided with corresponding correlated error estimates (see curved arrows between Factors). FWPE = Fieldwork Performance Evaluation form items.

Factor 1, *Professional Behaviors*, decreased from 12 to 4 FWPE items. Factor 2, *Clinical Reasoning/Skills*, decreased from 12 to 5 items. This factor was renamed *Intervention Skills* to better reflect the 5 FWPE items included with this factor. Factor 3, *Communication and Responsibility*, decreased from 14 to 4 items and was renamed *Evaluation Skills*. Factor determinacy scores indicated that all three factors were well measured (i.e., *Professional Behaviors* = .95, *Intervention Skills* = .97, *Evaluation Skills* = .93). It is recommended that factor determinacy scores have validity coefficients of .80 or higher (Gorsuch, 1983). Table 2 reports all the standardized and unstandardized coefficients for all the items for Factors 1, 2, and 3.

Table 2

Standardized and Unstandardized Regression Coefficients for Final CFA Structure

Observed Variable	Latent factor	β	SE	*B*	SE
Takes responsibility for professional competence (FWPE 37)	Professional Behaviors	.90	.03	1.00	0.00
Responds constructively to feedback (FWPE 38)	Professional Behaviors	.79	.04	.82	.08
Demonstrates consistent work behaviors (FWPE 39)	Professional Behaviors	.84	.04	.96	.08
Produces clear documentation (FWPE 33)	Professional Behaviors	.68	.06	.78	.09
Selects relevant occupations (FWPE 21)	Intervention Skills	.91	.02	1.00	0.00
Implements intervention plans that are client-centered (FWPE 22)	Intervention Skills	.87	.03	.95	.07
Implements intervention plans that are occupation-based (FWPE 23)	Intervention Skills	.85	.03	.93	.07
Chooses occupations that motivate (FWPE 20)	Intervention Skills	.80	.04	.91	.08
Modifies task approach, occupations, and environment (FWPE 24)	Intervention Skills	.75	.05	.89	.09
Administers assessments (FWPE 13)	Evaluation Skills	.81	.04	1.00	0.00
Documents the results of the evaluation (FWPE 17)	Evaluation Skills	.73	.05	.93	.12
Assesses client factors and contexts (FWPE 11)	Evaluation Skills	.66	.06	.84	.12
Selects relevant screening and assessment methods (FWPE 9)	Evaluation Skills	.68	.06	.76	.10

Note. CFA = Confirmatory Factor Analysis; β = standardized regression coefficients; *B* = unstandardized regression coefficients; SE = standard error; FWPE = Fieldwork Performance Evaluation item.

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Step Three: SEM

SEM was conducted to examine the relationship of the outcome variables (i.e., the final three-factor structure of *Professional Behavior, Intervention Skills, Evaluation Skills)*, the one mediator variable (i.e., competency exam risk indicator), and the seven predictor variables (i.e., faculty interview score, clinician interview score, observation hour range, admission GPA, admission science GPA, gross anatomy course grade, MBTI).

The initial SEM was a good fit to the data, χ^2 (137) = 161.62, p = .07, CFI = .96, RMSEA = .04, 90% CI [.00, .06]; however, several paths were determined to be non-significant. As a result, the SEM was modified so that a more optimal fit was achieved, χ^2 (119) = 98.66, p = .91, CFI = 1.0, RMSEA = .00, 90% CI [.00, .02]. Table 3 presents each of the steps in the re-specification of the SEM model and the goodness of fit indices for each step. Factor determinacy scores indicated that all three factors were well measured (i.e., *Professional Behaviors* = .92, *Intervention Skills* = .96, and *Evaluation Skills* = .93). Because there was no direct effect for the mediator variable (i.e., competency exam risk indicator), an analysis of a mediated model was not conducted.

Table 3

Steps for Re-specification of Structural Equation Model

Step	Reason for Modification	χ^2 (df) p	CFI/TLI	RMSEA (90% CI)
1. Initial SEM		161.62 (137) p = .07	.97/.95	.04 (.00, .06)
2. Drop FWPE_11	MI/cross loading, lowest factor loading	122.25 (116) p = .33	.99/.99	.02 (.00, .05)
3. Drop FWPE_20	MI	90.24 (96) p = .65	1.00/1.02	.00 (.00, .04)
4. Fixed parameters at 0 for non-significant loadings greater than .40 for F1	Free parameters	92.37 (102) p = .74	1.00/1.03	.00 (.00, .04)
5. Fixed parameters at 0 for non-significant loadings greater than .30 for F1	Free parameters	95.49 (105) p = .74	1.00/1.02	.00 (.00, .04)
6. Fixed parameters at 0 for non-significant loadings greater than .60 for F2	Free parameters	95.63 (110) p = .83	1.00/1.04	.00 (.00, .03)
7. Fixed parameters at 0 for non-significant loadings greater than .40 for F2	Free parameters	97.09 (113) p = .86	1.00/1.04	.00 (.00, .03)

Table 3 Continued				
Step	Reason for Modification	χ^2 (df) *p*	CFI/TLI	RMSEA (90% CI)
8. Fixed parameters at 0 for non-significant loadings greater than .60 for F3	Free parameters	97.46 (117) p = .91	1.00/1.05	.00 (.00, .02)
9. Fixed parameters at 0 for non-significant loadings greater than .40 for F3	Free parameters	98.66 (119) p = .91	1.00/1.05	.00 (.00, .02)

Note. SEM = Structural Equation Model; χ2 = Chi Square Goodness of Fit Index; df = degrees of freedom; *p* = probability value; CFI = Comparative Fit Index (greater than .95 is considered acceptable); TLI = Tucker-Lewis Index (greater than .95 is considered acceptable); RMSEA = Root Mean Square Error of Approximation (less than .06 is considered acceptable) FWPE = Fieldwork Performance Evaluation Item; F1 = Factor 1 (Professional Behaviors); F2 = Factor 2 (Intervention Skills); F3 = Factor 3 (Evaluation Skills); MI = Modification Indices.

The final SEM model yielded a parsimonious three-factor structure of the outcome variable. Factor 1, *Professional Behaviors*, decreased from 4 to 3 FWPE items. Factor 2, *Intervention Skills*, reduced from 5 to 3 items. Factor 3, *Evaluation Skills* reduced from 4 to 3 items. The standardized loading of each of the observed variables (i.e., FWPE items) on its respective factors (i.e., *Professional Behaviors, Intervention Skills, Evaluations Skills*) were moderately high to very high, ranging from .68 to .92. Table 4 reports all the standardized and unstandardized coefficients for all the FWPE items for Factors 1, 2, and 3. The Mplus software also generates correlations among latent factors. Correlations among the three latent factors ranged from .57 to .72; however, none of these correlations were significant. This supports that the latent factors represented distinct constructs.

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Table 4

Standardized and Unstandardized Regression Coefficients for Final SEM

Observed Variable	Latent Factor	β	SE	*B*	SE
Takes responsibility for professional competence (FWE 37)	Professional Behaviors	.85	.05	1.00	0.00
Responds constructively to feedback (FWE 38)	Professional Behaviors	.68	.06	.68	.10
Demonstrates consistent work behaviors (FWE 39)	Professional Behaviors	.78	.05	.92	.11
Produces clear documentation (FWE 21)	Intervention Skills	.92	.02	1.00	0.00
Implements intervention plans that are client-centered (FWE 22)	Intervention Skills	.89	.03	.96	.07
Implements intervention plans that are occupation-based (FWE 23)	Intervention Skills	.84	.03	.90	.07
Administers assessments (FWE 13)	Evaluation Skills	.81	.05	1.00	0.00
Documents the results of the evaluation (FWE 17)	Evaluation Skills	.72	.06	.90	.12
Selects relevant screening and assessment methods (FWE 9)	Evaluation Skills	.73	.06	.80	.11

Note. CFA = Confirmatory Factor Analysis; β = standardized regression coefficients; *B* = unstandardized regression coefficients; SE = standard error; FWPE = Fieldwork Performance Evaluation item.

The final SEM model also revealed four significant predictor variables (i.e., admission science GPA, gross anatomy course grade, observation hour range, MBTI thinking/feeling dimension) for the *Evaluation Skills* factor. None of the observed variables predicted the other two factors: Factor 1 (*Professional Behaviors*) and Factor 2 (*Intervention Skills*). Figure 3 presents the final SEM model with the factor loadings for each of the three latent factors, the correlations among these latent factors, and the significant pathways of the four predictor variables on Factor 3 (*Evaluation Skills*).

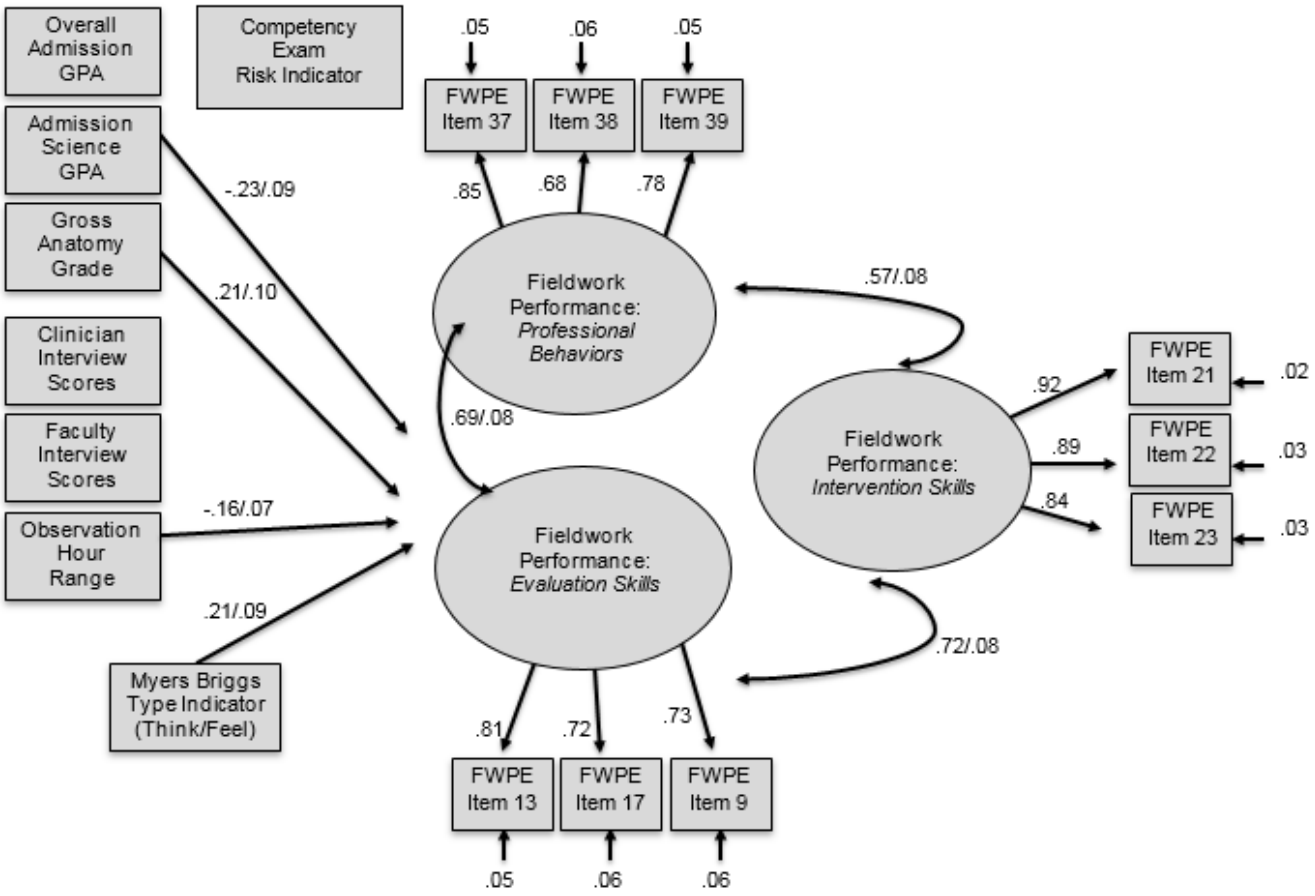

Figure 3. Final SEM solution. Diagram illustrates the final structure equation model with standardized maximum likelihood parameter estimates and error variances for each observed variable (see straight arrows to FWPE items). Correlation coefficients for correlated latent factors are provided with corresponding correlated error estimates (see curved arrows between Factors) as well as parameter estimates for significant paths and corresponding error variance (see straight arrows from observed variables to Factor 3). GPA = Grade Point Average; FWPE = Fieldwork Performance Evaluation form items.

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The observed variables, MBTI thinking/feeling dimension variable and gross anatomy course grade emerged as predictors with a positive relationship with Factor 3 (*Evaluation Skills*). In contrast, admission science GPA and observation hour range variables emerged as predictors with a negative relationship with Factor 3. Figure 3 shows the path coefficients which are the standardized estimated effects of each of the four predictors on Factor 3 (*Evaluation Skills*). All path coefficients were significant albeit small standardized regression coefficients as follows: MBTI thinking/feeling (β = .21, p = .02); anatomy course grade (β = .21, p = .03); admission science GPA (β = -.23, p = .01); and observation hour range (β = -.16, p = .03). Overall, the final SEM model accounted for 16.4% of the variance. Table 5 reports all the standardized and unstandardized regression coefficients for the significant paths in the final SEM.

Table 5

Standardized and Unstandardized Regression Coefficients for Final SEM Significant Paths

	β				*B*				
Model	Professional Behaviors	Intervention Skills	Evaluation Skills		Professional Behaviors	Intervention Skills	Evaluation Skills	SE	R^2
Direct Effect								.06	.16
Gross anatomy Grade			.21				.02	.10	
MBTI: Thinking/Feeling			.21				.22	.09	
Observation Hours			-.16				-.04	.07	
Admission Science GPA			-.23				-.20	.09	

Note. SEM = Structural Equation Modeling; β= standardized regression coefficients; *B* = unstandardized regression coefficients; SE = standard error; R^2 = variance explained by the model; MBTI = Myers Briggs Type Indicator; GPA = grade point average.

DISCUSSION

This program evaluation project examined the pre-program and program data of 121 OT students with regards to predicting fieldwork performance. The overarching aim of the project was to determine if the hypothesized model could identify those students at risk for poor fieldwork performance.

The first aim was to use factor analysis methods to specify latent factors and their associated observed variables that were included in the hypothesized model. Initial EFA and CFA analyses resulted in a more parsimonious structure for the FWPE. The current version of the FWPE has seven domains; however, this project's findings did not support a seven-factor structure. Instead, three strongly measured factors (i.e., *Professional Behaviors, Intervention Skills, Evaluation Skills)* emerged from the analyses. The results of the CFA supported a three-factor structure measured by 13 FWPE items rather than the original 42 items. The SEM model also supported the three-factor structure and reduced the total number of indicators to 9 FWPE items. The

results are similar to previous research that suggested that the previous version of the fieldwork evaluation form could be reduced from 175 items to as few as 7 items (Kirchner, Stone, & Holm, 2002).

In contrast, results of the EFAs for pre-admission and early program variables did not support *Academic Achievement* and *Professional Potential* as latent factors. These results suggest that grade related and interview measures are not sufficient to explain these constructs. Recent OT literature has explored student approaches to studying and certain student demographics (e.g., age, previous graduate experience, work experience) as factors associated with academic achievement (Bonsaksen, Brown, Lim, & Fong, 2017; Bonsaksen, Ellingham, & Carstensen, 2018).

The second aim was to evaluate the hypothesized effects of predictors on Level II fieldwork performance. Results of the SEM revealed that some of the hypothesized relationships were supported while others were not. Overall, the final SEM model only accounted for 16.4% of the variance for one of the three factors of fieldwork performance, Factor 3 (*Evaluation Skills*). None of the observed variables predicted the other two factors: Factor 1 (*Professional Behaviors*) and Factor 2 (*Intervention Skills*). Of the eight observed variables, the data supported four significant predictive pathways: two academic and two non-academic variables.

Academic Predictors

Two of the four academic measures (i.e., admission overall GPA, admission science GPA, gross anatomy course grade, competency exam risk indicator) emerged as significant predictors of fieldwork performance. The measures were gross anatomy course grade and admission science GPA.

Gross anatomy course grade had a positive predictive relationship with Factor 3 (*Evaluation Skills*). Higher grades in the course were associated with better performance on FWPE *Evaluation Skills* items (i.e., selects screenings/assessments, administers assessments, documents results of evaluation). Upon further speculation, the positive predictive relationship of gross anatomy course grade with fieldwork performance may suggest the possibility of confounding variables. For example, academic achievement is not the only factor related to successful completion of a 10-week, full cadaver gross anatomy course. Time management, effective resource utilization, and stress management skills are necessary to effectively meet the demands of this rigorous course. The intensity of learning a large amount of content in a short period of time often demands students to prioritize content, integrate feedback, modify study strategies, and manage their time and stress effectively. In comparison with demands of fieldwork, previous research has identified poor problem solving, poor organizational skills, and poor response to constructive criticism as factors that contributed to student failure of fieldwork (James & Mussleman, 2005). Research has also described students' perceptions of fieldwork as being an important yet stressful experience (Mitchell & Kampfe, 1990). Findings warrant further exploration of the potential relationship between students' performance in this anatomy course and constructs of resilience or ability to perform under pressure. Future research that

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examines the relationship among emotional intelligence, academic performance (particularly in rigorous courses), and fieldwork performance of occupational therapy students might help explain findings. Higher emotional intelligence has been shown to be a predictor of clinical performance (Brown et al., 2016) as well as academic performance (Fernandez, Salamonson, & Griffiths, 2012).

In contrast, admission science GPA had a negative predictive relationship with Factor 3 (*Evaluation Skills).* This relationship indicates an inverse association between higher admission science GPA and lower fieldwork ratings for *Evaluation Skills* items—one of the three factors on the FWPE. The other two factors *Professional Behaviors* and *Intervention Skills* did not have a significant relationship with admission science GPA. There is no apparent explanation for this result. Replicating the analysis with a larger sample of this program's students may provide additional information. This program calculates science GPA using the following courses: Anatomy & Physiology I; Anatomy & Physiology II; and either Kinesiology, Physics, or Biomechanics. Use of more science courses may warrant consideration.

Consistent with previous literature, admission overall GPA was not predictive of fieldwork performance. Likewise, the competency exam risk indicator was not predictive of fieldwork performance. The risk measure variable was a three-scaled proxy variable related to performance on OTKE and NBCOT practice tests. Actual exam results may have provided different results with regards to the predictability of competence exam scores; however, a recent study showed no difference in FWPE ratings for those students who passed or failed the national certification exam (Novalis, Cyranowski, & Dolhi, 2017).

Non-Academic Factors

Two of the four non-academic performance measures (i.e., faculty interview score, clinician interview score, MBTI, observation hour range) emerged as significant predictors of fieldwork performance. The measures were MBTI and observation hour range.

Of the four dimensions of the MBTI, only the Thinking/Feeling variable emerged as a predictor of fieldwork performance for Factor 3 (*Evaluation Skills*). The Thinking/Feeling dimension of the MBTI describes how one makes decisions. Results suggest that *thinking type* students perform better than *feeling type* students with regards to *Evaluation Skills* items, which makes sense conceptually. The three-factor structure for *Evaluation Skills* included the FWPE items: selects relevant screening and assessment methods; administers assessments; and documents the results of the evaluation. *Thinking* indicates an analytical, objective, and logical approach to decision making; whereas, *feeling* reflects a more subjective, value-oriented, and caring approach (Myers, McCaulley, Quenk, & Hammer, 2003).

In contrast, observation hour range variable had a negative predictive relationship with fieldwork performance. Larger numbers of observation hours were associated with lower fieldwork performance for Factor 3 (*Evaluation Skills*). For purposes of analysis,

number of hours was categorized into five ranges. The top range encompassed observation hours ranging from 237 to 3,803 hours. Exploration of what potentially confounding factors that might be associated with increased number of hours may be worthwhile (e.g., 2nd or 3rd time applying to the program thereby accumulating significantly more than the minimum requirement of 40 hours). Lastly, admission interview scores were not significant predictors of fieldwork performance, which concurs with existing published research (Lysaght et al., 2009).

Limitations

Several threats to the validity of the findings need to be acknowledged. This program evaluation project used student information from a single university which limits the extent to which results can be generalized. The validity and reliability of the FWPE is a concern due to the lack of psychometric evidence for the FWPE. Additionally, the use of proxy variables for range of observation hours and competency exam scores reduce the statistical power for these variables.

The inadequate explication of constructs of *Academic Achievement* and *Professional Potential* may be attributed to the limited number of variables. It is recommended that future studies include more observed variables to identify similar latent factors.

Lastly, some analysis methods may be better suited due to the ordinal nature of several items. The weighted least squares means and variance (WLSMV) estimation method is considered the best option for categorical and ordinal data (Brown, 2006). Use of the WLSMV estimation method rather than maximum likelihood method would be preferred due to the ordinal, measurement scale of the outcomes variables (i.e., FWPE items) as well as the restricted range of several of the variables (e.g., GPA, competency exam risk measure).

CONCLUSION

Although the results of this program evaluation project did not fully support the hypothesized model, some interesting findings emerged for future exploration. It appears that several of the common measures used by admission committees to select candidates for OT programs lack predictive validity with regards to clinical performance. Moreover, factors to identify students at risk for poor fieldwork performance have not been precisely identified. Recent research has shown the predictability of several emotional intelligence factors on fieldwork performance (Brown et al., 2016). Further examination of attributes, such as emotional intelligence, time management, critical thinking, and resilience may provide valuable information to predict those students who are at risk for poor fieldwork performance.

Lastly, the findings also raise some important structural issues of the FWPE. Although the purpose of the project was not to examine the validity of the FWPE, results of the factor analyses suggest the possibility for a more parsimonious evaluation form with fewer items. To date, there are no published studies that support the validity of the seven FWPE domains. More studies need to be conducted to determine if further simplification of the FWPE is needed.

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