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Personality oriented job analysis to identify non-cognitive factors for a doctor of physical therapy program in the United States

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**Abstract**

It aimed to conduct a personality oriented job analysis to identify non-cognitive factors that may predict successful performance or performance difficulties in doctorate in physical therapy (DPT) students. The study employed focus groups and a survey with 9 DPT subject matter experts. Focus group participants including 3 DPT faculty members and 4 recent graduates of the DPT program identified 22 non-cognitive factors. Out of them, 15 factors were possibly associated with successful performance and 7 factors were possibly associated with performance difficulties. The questionnaire employing the Combination Job Analysis Method resulted in 12 factors which could be used in selection, and 10 which could be incorporated into training. The present study employed an established job analysis method using subject matter experts to identify a broad array of factors that go beyond what previous studies have examined, and which may predict success or difficulties in a DPT program.

**Keywords:** Personality, non-cognitive factors, doctorate of physical therapy students, questionnaires

Successful completion of the doctor of physical therapy (DPT) education program and the National Physical Therapy Examination (NPTE) are key measures of outcomes for physical therapist education programs. Minimum expectations for these outcomes are established by the Commission on Accreditation in Physical Therapy Education (CAPTE) and institutional performance on these outcomes contribute to institutional reputation.

Selection of applicants who have a strong likelihood of success in the DPT education program and on the NPTE is one goal of the admissions process. Currently, DPT education programs use a combination of cognitive and non-cognitive factors to select appropriate candidates for their programs. Cognitive factors used in admissions decisions may include undergraduate Grade Point Average (uGPA), prerequisite course Grade Point Average (pGPA), and Graduate Record Examination (GRE) scores. Measures of non-cognitive factors are frequently obtained through essays, letters of recommendation and interviews.

Predictors of student success in DPT education programs and on the NPTE have been the focus of numerous studies. Utzman, Riddle, and Jewell [1] found that demographic factors such as age and race/ethnicity and quantitative cognitive data including GPA and GRE scores account for 24% and 28% of the variability in academic and NPTE success, respectively. The evidence regarding measures of non-cognitive factors evaluated through essays, letters of recommendation, observation hours and interviews to predict academic and NPTE success is conflicting [2].

There has been increased interest in personality factors that influence student performance. Kappe and van der Flier [3] found that 33% of the variance in GPA and 30% of the variance in time to graduation in higher education is attributed to a combination of student related factors measured by

the Big Five Personality Inventory. The Big Five Personality Inventory [4] [and the Non-Cognitive Questionnaire-Revised [5] did not predict scores on the NPTE in studies limited to one physical therapy education program. Resilience is defined as “a personality characteristic that moderates the negative effects of stress and promotes adaptation”. In graduate nursing students, there is a strong correlation between resilience and the academic success [6], however, this has not yet been studied in DPT education. Roll et al [7] developed a survey measuring non-cognitive factors such as emotional intelligence and grit intended for use in DPT program admissions processes. This survey’s ability to predict students’ success is yet to be validated.

Personality-Oriented Job Analysis (POJA) is a widely accepted method used by Industrial and Organizational Psychologists to identify personality factors that may contribute to success in a job role. In a study to determine if those personality factors impacted medical school students’ academic and clinical performance, it was indicated that the personality factors accounted for 8.2% and 7.8% more variance in the academic and clinical performance, respectively, than the traditionally used measures alone [8].

The present study is a POJA for physical therapy doctoral students. It represents the first two phases (Focus Group and POJA Questionnaire) of a planned validation study to investigate the extent to which non-cognitive factors can predict academic performance, retention, clinical performance, and performance on the NPTE. The POJA process is described and results are presented. Results will be used to determine which non-cognitive factors will be used in the validation phases of the study.

Ethical statement: The study was approved by the Institutional Review Board of Sacred Heart University (No:180130A). Informed consent was obtained from the participants.

Study design: The first phase of the study consisted of focus groups with DPT Subject Matter Experts (SMEs). The second phase was a cross sectional survey of SMEs from one university.

Materials and subjects:

### **Phase I Focus Groups**

Participants

SMEs were identified by one of the authors and were invited to participate. Three DPT faculty members (three classroom instructors, one of whom also oversees clinical rotations) participated in one group. Four recent graduates of the DPT program participated in a separate group, by conference call.

Materials and Procedure

A list of 34 possible POJA traits were identified from the department's list of essential functions for physical therapists –[9]], as well as from previous health care related studies [2, 8]. Descriptions of items were obtained from the International Personality Item Pool (IPIP) website and were edited for clarity. Research in leader performance has increasingly shown the importance of studying negative as well as positive factors that affect performance, as they can coexist in people. Negative factors can derail what would otherwise be positive performance. Therefore, the stimulus list purposely included factors that could be detrimental to performance or lead to performance difficulties.

SMEs were given the stimulus list of POJA traits and definitions and they were asked to critique them for clarity, condense and combine traits and definitions, and to add any new traits if appropriate. This resulted in a list of 22 traits and definitions, 15 of which could be associated with successful performance, and seven which could be associated with performance difficulties.

## Phase II POJA Questionnaire

### Participants

Eleven SMEs were recruited to participate in the study. Nine SMEs participated, including 6 DPT faculty members, and 3 recent graduates who had passed the NPTE and were employed as physical therapists.

### Materials and Procedure

A questionnaire with 22 POJA traits and definitions was developed and is presented in the Appendix. Response scales for the personality factors were adapted from the Knowledge Skills Abilities and Other Characteristics sections of Levine's Combination Job Analysis Method (C-JAM) as described by Brannick, Levine, and Morgeson [10]]. Wording of the scales was modified to be appropriate for student admissions rather than job applicants. SMEs rated traits on four scales. Is this factor necessary for new DPT students (yes/no)? Is this factor practical to expect among DPT applicants (yes/no)? To what extent is trouble likely if ignored in admissions, rated on a 5 point scale (1 = very little or none to 5 = to an extremely great extent). And to what extent do different levels of the factor distinguish the superior from average student (5 point scale, 1 = very little or none to 5 = to an extremely great extent). For the seven factors that could be associated with performance difficulties the first two scales were reworded to "Is the factor detrimental for new first year DPT students?" and "Is the factor common among DPT applicants?"

Previous studies of POJA identified several response errors including self-serving bias, implicit trait policies, social projection, and false consensus. Aguinis, Mazurkiewicz, and Heggstad's [11] randomized trial showed that frame of reference (FOR) training reduced bias, decreased the

correlation between SMEs own personality traits and the POJA trait ratings, and also decreased overall POJA ratings, compared to a group given standard instructions. A subsequent meta-analysis showed that FOR training improved the accuracy of ratings [12] . Therefore, specific instructions were provided to reduce response errors and to improve accuracy. SMEs were presented with the following instructions at the beginning of the questionnaire: "When considering the factors it is important to think about DPT students in general, not just yourself as you were as a student. For example, while you may have always kept your desk area very neat and as organized as possible, many students may not do this and they may still be successful." The questionnaire was created in SurveyMonkey and a link was emailed to 11 SMEs.

Technical information:

The C-JAM process [10] is to compute the number of SMEs who answered "yes" to 1) whether the trait is necessary for new students, *and* 2) whether the trait is practical to expect among applicants . Also, means were computed for 1) trouble likely if ignored in admissions, and 2) whether the trait would distinguish superior from average students. If a majority of SMEs answer yes that the trait is necessary and practical to expect and the mean for trouble likely is greater than 1.5, then the trait can be incorporated into selection procedures. For those traits to be used in selection, if the mean of distinguish superior from average is greater than 1.5, then selection procedures including it should result in a rank ordering of applicants. If the distinguish superior from average mean is equal to or lower than 1.5, a pass/fail selection procedure should be developed.

C-JAM also has decision rules for which traits can be used in training. That is if less than a majority of SMEs agreed that the trait is necessary for new students and the mean for distinguishes superior from average students is greater than 1.5, it is recommended for training.

The present study included several methodological improvements. First, 5-point rating scales were used, rather than 3-point scales to allow for more nuanced variation in ratings [13]. Second, SMEs answered four questions about each factor, and C-JAM's structured decision making process was used to decide which personality factors to include in selection and which to recommend for training. Third, frame of reference instructions for SMEs were included which was shown to decrease self-serving bias, implicit trait policies, social projection, and false consensus, and to improve accuracy [11,12] [].

Focus group participants including 3 DPT faculty members and 4 recent graduates of the DPT program identified 22 non-cognitive factors. Out of them, 15 factors were possibly associated with successful performance and 7 factors were possibly associated with performance difficulties. Table 1 presents the questionnaire results for factors to be considered for selection. Following the decision rules for C-JAM outlined previously, the SME ratings resulted in 12 factors to be considered for selection (11 desirable factors, and 1 undesirable factor). Table 2 presents the results for factors to be considered for training. The SME ratings also yielded 10 factors recommended for training (4 desirable factors and 6 undesirable factors).

The C-JAM process resulted in 12 factors to be included in selection procedure validation, in addition to the cognitive procedures currently in place. Several of these factors aligned with the findings of Roll et al. [7]. Specifically, measures of adaptability, interpersonal skills and tolerance in the POJA were similar to Roll et al.'s measures of adaptability, intuitiveness and engagement respectively. However, the results of the C-JAM identified several additional factors that could be included in selection, 8 of which are expected to contribute positively to performance, and 1 which

is expected to contribute to performance difficulties. Additionally, 4 of the top 6 factors identified by McLarnon et al. [8] (conscientiousness, calm/relaxed, tolerance and responsibility) were also factors identified in the present study. Of note, however, is that McLarnon et al.'s methodology utilized a rating scale that ranged from disastrous to essential, and selected the factors that scored the highest. This effectively eliminated any undesirable factors. The present study separated ratings for desirable and undesirable factors to result in a spectrum factors. Interestingly, the majority of SMEs indicated that those 6 undesirable factors are not common among applicants. C-JAM rules suggest that they can be recommended for further training. However, since they are uncommon, further discussion with SMEs is warranted regarding the utility of training for such uncommon factors.

The present study included several methodological strengths. First C-JAM is a formal, standardized job analysis process with clear decision rules, and the results can be used for both selection and training. Second, performing job analysis and utilizing SMEs in that process is recommended in the Uniform Guidelines on Employee Selection Procedures [14] to ensure validity and improve legal defensibility. Third, while most studies focus on positive factors, the present study included several factors that may lead to performance difficulties. Fourth, instructions to SMEs included frame of reference training which has been shown to reduce bias and improve accuracy in ratings [11,12]. Fifth, the subsequent validation study will identify scientific, and legally defensible non-cognitive measures that could help improve the selection and retention of first year students, as well as improve performance in clinical placements, and first time pass rates on the NPTE.

A limitation is that the DPT education program studied utilizes a problem-based learning curriculum. This curricular model is used by 1.7% of PT education programs nationally [15].

Therefore the results may not generalize to other DPT education curricula, and would need to be verified in other programs.

In conclusion, the present study is the first step in the process of identifying and validating non-cognitive factors that may contribute to success and difficulties in a DPT education program.

Previous studies of non-cognitive factors such as demographics or essays have produced conflicting results. Using SMEs, the present analysis identified a broad array of factors that go beyond those examined in previous studies, and which can be validated. The next step is to conduct a concurrent validation study by administering personality measures of those factors to current DPT students, and correlating scores on the measures with course grades, clinical rotation performance and NPTE scores.

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## **Authors' contributions**

Conceptualization: MC, KS

Data acquisition: KS

Data analysis: MC

Project administration: KS

Writing—original draft: MC, KS

Writing—review & editing: MC, KS

## **Conflict of Interest**

No potential conflict of interest relevant to this article was reported.

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## **References**

1. Utzman RR, Riddle, DL, Jewell, DV. Use of demographic and quantitative admissions data to predict performance on the National Physical Therapy Examination. *Phys Ther* 2007;87:1181-1193. doi:10.2522/ptj.20060222. .
2. Hollman JH, Rindfleisch AB, Youdas JW, Krause DA, Hellyer NJ, Kinlaw D. Retrospective analysis of the behavioral interview and other preadmission variables to predict licensure examination outcomes in physical therapy. *J Allied Health*, 2008;37:97-104.
3. Kappe R, van der Flier H. Predicting academic success in higher education: What's more important than being smart? *Eur J Psychol Educ* 2012;27:605-619. doi:10.1007/s10212-011-0099-9.
4. Galleher C, Rundquist P, Barker D, Chang W. Determining cognitive and non-cognitive predictors of success on the National Physical Therapy Examination. *IJAHSP* 2012;10(4): [10p.]
5. Guffey JS, Farris JW, Aldridge R, Thomas T. An evaluation of the usefulness of noncognitive variables as predictors of scores on the national physical therapy licensing examination. *J Allied Health* 2002;31:78-86.

6. Beauvais AM, Stewart JG, DeNisco S, Beauvais JE. Factors related to academic success among nursing students: A descriptive correlational research study. *Nurse Educ Today* 2014; 34: 918-23. doi: 10.1016/j.nedt.2013.12.005.
7. Roll M, Canham L, Salamh P, Covington K, Simon C, Cook C. A novel tool for evaluating non-cognitive traits of doctor of physical therapy learners in the United States. *J Educ Eval Health Prof* 2018;15:19. <https://doi.org/10.3352/jeehp.2018.15.19>
8. McLarnon MJW, Rothstein MG, Goffin RD, Rieder MJ, Poole A, Krajewski HT, Powell DM, Jelley RB, Mestdagh T. How important is personality in the selection of medical school students? *Pers Individ Dif* 2017;104:442-447.
9. Essential functions of the physical therapy profession [Internet]. Fairfield (CT): Sacred Heart University, Doctoral Program of Physical Therapy; [cited 2018 Dec 6]. Available from: <https://www.sacredheart.edu/academics/collegeofhealthprofessions/academicprograms/physicaltherapy/doctorofphysicaltherapy/essentialfunctionsofthephysicaltherapyprofession/>
10. Brannick MT, Levine EL, Morgeson FP. Job and work analysis: methods, research, and applications for human resource management. Los Angeles: Sage Publications; 2007.
- 11., Aguinis H, Mazurkiewicz MD, Heggstad ED. Using web-based frame-of-reference training to decrease biases in personality-based job analysis: an experimental field study. *Pers Psychol* 2009;62:405-438. <https://doi.org/10.1111/j.1744-6570.2009.01144.x>
12. Roch SG, Woehr DJ, Mishra V, Kieszczyńska U. Rater training revisited: an updated meta-analytic review of frame-of-reference training. *J Occup Organ Psychol* 2012; 85:370-395. <https://doi.org/10.1111/j.2044-8325.2011.02045.x>
13. Raymark H, Schmit MJ, Guion RM. Identifying potentially useful personality constructs for employee selection. *Pers Psychol* 1997;50:723-736.

14. Uniform Guidelines on Employee Selection Procedures [Internet]. Washington, DC (US): US Code of Federal Regulations; 1978 [cited 2018 Nov 21]. Available from:  
<https://www.gpo.gov/fdsys/pkg/CFR-2011-title29-vol4/xml/CFR-2011-title29-vol4-part1607.xml>
15. Commission on Accreditation in Physical Therapy Education. Aggregate Program Data: 2016-2017 Physical Therapist Education Programs Fact Sheets [Internet]. Alexandria (VA): Commission on Accreditation in Physical Therapy Education; 2017 Mar 10 [updated 2017 Jul 31; cited 2018 Dec 6]. Available from:  
[http://www.capteonline.org/uploadedFiles/CAPTEorg/About\\_CAPTE/Resources/Aggregate\\_Program\\_Data/Archived\\_Aggregate\\_Program\\_Data/2016PTFactSheetFinal.pdf](http://www.capteonline.org/uploadedFiles/CAPTEorg/About_CAPTE/Resources/Aggregate_Program_Data/Archived_Aggregate_Program_Data/2016PTFactSheetFinal.pdf)

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Table 1. Personality factors for selection

Desirable Factors	M (SD) <sup>a</sup>	Undesirable Factors	M (SD) <sup>a</sup>
Ethics/integrity/honesty	4.22 (1.39)	Anxiousness/neuroticism	3.00 (1.00)
Team player/collaborative	3.89 (1.17)		
Resilience/ perseverance/grit/poise	3.78 (1.09)		
Analytical	3.56 (1.24)		
Grit	3.55 (1.33)		
Tolerance	3.44 (0.88)		
Accountable/dependable/conscientiousness	3.22 (0.83)		
Interpersonal skills	3.11 (1.45)		
Adaptability	2.67 (1.12)		
Problem Sensitivity	2.67 (1.12)		
Problem solving/ decision making/self- reflection	2.44 (1.01)		

<sup>a</sup>Trouble likely if ignored in selection

Table 2. Personality factors for training

Desirable Factors	M (SD) <sup>a</sup>	Undesirable Factors	M (SD) <sup>a</sup>
Inquisitiveness	3.89 (0.93)	Lack of resiliency	4.56 (0.72)
Assertiveness	3.00 (1.32)	Lack of accountability	4.33 (0.71)
Social Confidence	2.78 (1.09)	Lack of focus	4.22 (0.97)
Perfectionism	1.89 (0.60)	Lack of maturity	4.22 (1.39)
		Dominance/aggressiveness	3.22 (1.20)

<sup>a</sup>Distinguishes superior from average

