

2024

Variables Impacting First Time Pass Rates of MSOT Students

Amy L. Brzuz
Gannon University

Julia M. Hawkins-Pokabla
Gannon University

David Prier
Gannon University

Follow this and additional works at: <https://encompass.eku.edu/jote>



Part of the [Occupational Therapy Commons](#)

Recommended Citation

Brzuz, A. L., Hawkins-Pokabla, J. M., & Prier, D. (2024). Variables Impacting First Time Pass Rates of MSOT Students. *Journal of Occupational Therapy Education*, 8 (4). Retrieved from <https://encompass.eku.edu/jote/vol8/iss4/11>

This Original Research is brought to you for free and open access by the Journals at Encompass. It has been accepted for inclusion in Journal of Occupational Therapy Education by an authorized editor of Encompass. For more information, please contact laura.edwards@eku.edu.

Variables Impacting First Time Pass Rates of MSOT Students

Abstract

To enter practice as an occupational therapist, one must complete an occupational therapy program at an accredited institution and then pass a national certification exam. This exam is called the National Board for Certification in Occupational Therapy (NBCOT) Exam. Individuals can take the exam more than once to achieve a passing score but must pay a fee each time. Not passing the first time can lead to stress, increased costs, and delayed entrance into the profession. Thus, being a first-time passer is ideal. The purpose of this retrospective quantitative study was to identify variables impacting first time pass rates of occupational therapy master's students. Variables found to be significantly higher in the first time pass group compared to the multiple attempts group include high school grade point average (hsGPA), Scholastic Aptitude Test (SAT) scores, whether or not the student earned an A in high school chemistry or biology, whether or not the student took high school physics, undergraduate college GPA, whether or not the student earned an A in certain occupational therapy intervention courses, and percentage correct on the Occupational Therapy Knowledge Exam (OTKE). Results of this study can inform occupational therapy programs' admissions standards and help educators better prepare and support students throughout the entire curriculum to facilitate first time success on the NBCOT exam.

Keywords

First time pass, NBCOT exam, occupational therapy, cognitive variables

Creative Commons License



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Acknowledgements

The authors would like to thank Allison Wargo for her contributions to data collection and David LeVan for his thoughtful review.

JOTE

Journal of Occupational
Therapy Education

Volume 8, Issue 4

Variables Impacting First Time Pass Rates of MSOT Students

Amy Brzuz, OTD, OTR/L

Julia Hawkins-Pokabla, OTD, OTR/L

David Prier, PhD

Gannon University

United States

ABSTRACT

To enter practice as an occupational therapist, one must complete an occupational therapy program at an accredited institution and then pass a national certification exam. This exam is called the National Board for Certification in Occupational Therapy (NBCOT) Exam. Individuals can take the exam more than once to achieve a passing score but must pay a fee each time. Not passing the first time can lead to stress, increased costs, and delayed entrance into the profession. Thus, being a first-time passer is ideal. The purpose of this retrospective quantitative study was to identify variables impacting first time pass rates of occupational therapy master's students. Variables found to be significantly higher in the first time pass group compared to the multiple attempts group include high school grade point average (hsGPA), Scholastic Aptitude Test (SAT) scores, whether or not the student earned an A in high school chemistry or biology, whether or not the student took high school physics, undergraduate college GPA, whether or not the student earned an A in certain occupational therapy intervention courses, and percentage correct on the Occupational Therapy Knowledge Exam (OTKE). Results of this study can inform occupational therapy programs' admissions standards and help educators better prepare and support students throughout the entire curriculum to facilitate first time success on the NBCOT exam.

Occupational therapy (OT), like many health professions, is a profession that serves the public and thus is highly regulated for safety concerns. First, academic program content is regulated by the Accreditation Council for Occupational Therapy Education (ACOTE). Occupational therapy programs at all levels must regularly demonstrate compliance with

ACOTE's general content, fieldwork, and, if applicable, capstone standards. Then, upon graduation, for OT students to enter the profession and apply for state licensure to practice, they must pass a national certification exam. This exam is called the National Board for Certification in Occupational Therapy (NBCOT) Exam. Passing this exam is required to obtain state licensure to practice as an initially registered occupational therapist. And finally, after state licensure is obtained, OT practitioners must demonstrate continued competence on an ongoing basis to maintain their state licensure (O'Brien & Conners, 2024).

Academic OT programs are invested in students' educational achievement and long-term success. This includes student preparedness to take and pass the NBCOT exam. While academic OT programs are not involved in the NBCOT exam process itself, program faculty tend to have an interest in preparing students for success because if a student does not pass the exam, they are not able to enter OT practice. Also of note, other stakeholders have a vested interest in exam preparedness such as parents and university administration. High pass rates are desirable and can be marketed as a recruitment tool. NBCOT has made a pre licensure exam available for programs to offer students called the Occupational Therapy Knowledge Exam (OTKE). Programs can use this pre-test to determine students' readiness for the national exam and to assist students in creating individualized study plans (Wilson et al., 2021). Also, ACOTE has a standard that requires academic programs to have an annual pass rate of at least 80% or higher (ACOTE, 2023). If programs do not meet this standard, this could lead to a program being closed due to non-compliance. Further, the exam costs over \$500.00 (NBCOT, 2023). It is in students' best interest to pass the first time to prevent financial hardships, undue stress, and prevent delay of entry into the profession. The purpose of this study was to identify variables that affect first time pass rates of Master of Science OT students at a small private university near the East Coast of the United States.

Literature Review

Literature across allied health disciplines such as OT, physical therapy, nursing, and athletic training indicates there are cognitive and non-cognitive factors that contribute to first-time pass rates on high stakes certification exams. Non-cognitive factors can include intrinsic motivation, demographics, study strategies, personal interviews, and self-efficacy (Bonsaksen et al., 2017; Breen-Franklin & Bonsaksen, 2021; Cook et al., 2015; Spohn et al., 2021). Cognitive factors include undergraduate grade point average (uGPA), standardized test scores, and grades in academic courses (Jones et al., 2014; Kurowski-Burt et al., 2020; Spohn, et al., 2021). A study by Salvatori (2001) indicated cognitive factors, also called variables, have been shown to be the best predictors of academic achievement in the health professions. Cognitive variables are also the easiest to measure and track programmatically. While the authors acknowledge the importance of non-cognitive variables in predicting first time pass rates, the focus of the current study is cognitive variables.

Monitoring cognitive variables throughout students' time in an OT program can help to identify those who may not be successful at passing the NBCOT exam the first time. Programmatic supports can be put in place early to assist these students in increasing

their chance of passing the first time. Cognitive variables that have shown to be predictors of future performance on allied health profession certification exams include uGPA (Cook et al., 2015; Dockter, 2001; Jones et al., 2014; Khan-Farooqi, 2020; Kurowski-Burt et al., 2020; Novalis et al., 2017; Roman et al., 2019; Salvatori, 2001; Spohn et al., 2021; Utzman et al., 2007; Wolden et al., 2019), grades in college courses (Andreef, 2014; Beeman & Waterhouse, 2001; Kurowski-Burt et al., 2020; Spohn et al., 2021), pre certification exam performance such as the OTKE (Avi-Itzhak, 2015; Kurowski-Burt et al., 2020; Wilson et al., 2021), and pre admission standardized tests such as the Graduate Record Examination (GRE) and Scholastic Aptitude Test (SAT; Khan-Farooqi, 2020; Kurowski-Burt et al., 2020; Roman & Buman, 2019; Utzman et al., 2007).

There is a lack of literature pertaining to high school course grades and first-time pass rates on allied health certification exams. There is also a lack of information pertaining to the relationship between final high school grade point average (hsGPA) and first-time pass rates on these certification exams. There are OT programs that admit students directly from high school into their accelerated programs that lead to an undergraduate degree and then a graduate degree. While it is acknowledged that students do grow academically and personally while in college, this high school information could prove helpful in even earlier identification of students who may need additional supports to pass their certification exam the first time.

The purpose of this research study is to identify variables impacting first time pass rates of OT students in a master's program at a small private university in the eastern United States. Variables include high school grades in science and math courses, final hsGPA, standardized test scores required for college admissions, final college uGPA, grades in OT intervention courses including fieldwork scores, and OTKE scores. Knowing what variables impact these students' first-time pass rates will help the program identify students who may need more than one attempt to pass the NBCOT exam. Early intervention efforts can be put in place to assist these students in the hopes of increasing their success, decreasing the stress of needing to re-take the exam, and saving them the additional costs required for a re-test. This information could also be used by OT program directors to advocate for resources to support student preparation for success on the NBCOT exam. In addition, knowing what variables affect first time pass rates could also prove helpful in the program's admission process. Currently, many colleges and universities waive SAT and ACT requirements for admissions in the hopes of promoting inclusion and diversity (New York Times, 2020). A better understanding of how high school grades and overall hsGPA correlate to certification exam pass rates could be helpful in re-framing the program's admission process. In addition, if programs can use this information to increase their first-time pass rates, competition between programs may increase thus improving the quality of OT programs, and the quality of the healthcare professionals they produce. Therefore, this research study focuses on the relationship between first-time pass rates on the NBCOT exam and academic performance leading up to it.

Methodology

Design and Sample

This study used a retrospective data analysis to determine what variables might impact first-time pass rates of OT students. Data was collected relating to 244 master of science OT students who were enrolled at the university and took the NBCOT exam between 2015 and 2021. It is important to note that this program had two entry points. Most students entered the program directly from high school and completed a five-year accelerated program. They had four years of undergraduate coursework that included OT content. After these four years they earned a bachelor's degree and then completed one year as official graduate students. After that additional year, they earned their master's degree. Some students entered this program as post baccalaureate students. These students completed undergraduate coursework at another university and then entered the five-year accelerated program at year three. These students completed three years of coursework before graduating with their master's degree.

For this study, all students were analyzed from the same lens. This is why researchers did not analyze variables such as admission pre-requisites; they were different for each group of students. Researchers collected data pertaining to all students' performance in the following areas: hsGPA, high school grades in science courses, SAT scores, ACT scores, OT program course grades, Level II fieldwork course scores, uGPA, OTKE test performance, and NBCOT passing status (first time vs multiple attempts). All data was recorded on an Excel spreadsheet. Institutional Review Board (IRB) approval was granted by the university at which the study was conducted (IRB-2021-9-6777).

Measures

A graduate assistant assisted Researcher One in collecting data from the university admissions and transcript systems and created a spreadsheet with data sets used for data analysis.

High School GPA

The university admissions system was accessed to collect study participants' cumulative GPA at time of high school graduation. Post baccalaureate students were not included in this data set because the university did not have this information.

High School Course Grades

The university admissions system was accessed to collect study participants' final grades in high school chemistry, biology, and physics. Post baccalaureate students were not included in this data set because the university did not have this information.

Standardized Test Scores required for college admissions (SAT, ACT)

The university admissions system was accessed to collect study participants' SAT and/or ACT score, if one was provided. Post baccalaureate students were not included in this data set because the university did not have this information.

OT Program Course Grades

The university transcript system was accessed to collect each study participant's final grade in the following OT intervention courses: OT Intervention: Physical Disabilities I and II (lectures and labs); OT Intervention: Pediatrics and Developmental Disabilities I and II (lectures and labs); OT Intervention: Psychosocial I and II (lectures and labs); Clinical Neuroscience; Neurorehabilitation Techniques (lecture and lab); Intervention Techniques for Gerontology; and Community Based Intervention. Intervention courses were chosen because in the curriculum, these courses stimulated higher level thinking of the entire OT process, across the lifespan. This is similar to the way students will need to reason during the NBCOT exam. The other courses in the curriculum, that were not chosen, mostly contained content that is applied in these intervention courses.

Fieldwork II Course Scores

The university transcript system was accessed to collect each study participant's final grade in their Level IIa and IIb fieldwork courses. Level I fieldwork performance was not analyzed for this study because in the curriculum, Level I fieldwork experiences are embedded into the intervention courses; thus, Level I fieldwork performance is reflected in students' intervention course grades. These course grades were already being analyzed in this study. Two students repeated Level IIa fieldwork and three repeated Level IIb fieldwork; these students were not accounted for in this part of the analysis.

Undergraduate GPA

The university transcript system was accessed to collect each study participant's final uGPA. The official university uGPA was used for all students. The researchers did not differentiate if a student took any undergraduate courses more than once to meet program requirements. All study participants' uGPA were included regardless of their program entry point.

OTKE Test Performance

Researcher One was also the Program Director and thus had access to all students' OTKE results. This information was accessed through the NBCOT Program Director portal online. Results were recorded for each student in each domain and task area. The OTKE changed their domain areas slightly for this study's participants who took the test in 2019 and 2020. These students' OTKE results were analyzed separately.

NBCOT Pass Status

Researcher One accessed students' NBCOT passing status through the NBCOT Program Director Portal. Students were identified as a first-time passer (FTP) or a student who required multiple attempts (MA).

Data Analysis

All data was mined and recorded on one Excel spreadsheet that was de-identified before data analysis by Researcher Three. The analysis was conducted using MS Excel's Statistics Package. A level of significance of 0.05 was set for the entire study.

Results

Data was gathered from 244 OT students who took the NBCOT exam. Of this sample, 11 were males and 233 were female. Of those students, 192 passed the exam on their first attempt. It was hypothesized that statistically significant differences would be found between these two groups in the following areas: hsGPA, SAT scores, high school course grades, OT program course grades, Level II fieldwork course scores, uGPA, and OTKE test performance.

High School Grade Point Average

There were 200 students who had recorded hsGPA scores. Some students were post baccalaureate students and thus did not have high school transcripts on file. The average GPA for the 159 FTP students was 3.746403 while the average of the 41 MA students was 3.577512. Using a t-Test, a p-value of 0.001849 was found showing that the FTP group had a significantly higher high school GPA. See Table 1.

Table 1

HS GPA at Graduation

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	3.746403	3.577512
Variance	0.092919	0.104165
Observations	159	41
P(T<=t) one-tail	0.001849	

High School Grades

Biology

There were 198 students who had recorded high school Biology grades. The actual difference in high school Biology grades ended up being not statistically significant with a p-value of 0.0675. See Table 2. However, if a student earned an A in high school Biology, there was an 89.77% chance that they would be in the FTP group. This was significantly higher than the student who did not earn an A in high school Biology who had a 72.73% chance of being in the FTP group. Using a 2-sample independent proportions test, a very significant p-value of 0.00136 was found. See Table 3.

Therefore, if a student earned an A in high school biology, they were significantly more likely to be in the FTP group.

Table 2*High School Biology Grades*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	3.329559748	3.133333
Variance	0.625259932	0.501754
Observations	159	39
P(T<=t) one-tail	0.067511944	

Table 3*High School Biology Percentage of A Grades*

HS Biology Percentage of A's		
	A	Not A
FTP	79	80
MA	9	30
Sample Percentages	0.897727	0.727273
p-value	0.00136	

Chemistry

There were 200 students who had recorded high school Chemistry grades. The actual difference in high school Chemistry grades ended up being insignificant with a p-value of 0.2246. See Table 4. However, if a student earned an A in high school Chemistry, there was an 85.9% chance that they would be in the FTP group. This was significantly higher than the student who did not earn an A in high school Chemistry who had a 76.23% chance of being in the FTP group. Using a 2-sample independent proportions test, a significant p-value of 0.047738 was found. See Table 5. Therefore, if a student earned an A in high school Chemistry, they were significantly more likely to be in the FTP group.

Table 4*High School Chemistry Grades*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	3.246875	3.16
Variance	0.635084513	0.362974359
Observations	160	40
P(T<=t) one-tail	0.224589084	

Table 5*High School Chemistry Percentage of A Grades*

	A	Not A
FTP	67	93
MA	11	29
Sample Percentages	0.8590	0.7623
p-value	0.047738	

Physics

Of the 200 students who provided grades for their high school science classes, only 119 took a high school Physics class. That fact alone made them significantly more likely to be in the FTP group with a p-value of 0.04195. See Table 6. However, students who took high school Physics and earned an A were even more likely to be in the FTP group with a p-value of 0.00166. See Table 7.

Table 6*Percentage who took High School Physics*

	Took It	Did Not
FTP	100	60
MA	19	21
Sample Percentages	0.8403361	0.740741
p-value	0.04195	

Table 7*High School Physics Percentage of A Grades*

	A	Not A
FTP	48	111
MA	3	37
Sample Percentages	0.941176	0.75
p-value	0.00166	

Standardized Test Scores: SAT and ACT

SAT and ACT scores were gathered. One hundred seventy-five of the students provided SAT scores. If a student took the SAT or ACT more than once, the highest score was analyzed. A summary of that data is in Table 8. The average FTP SAT score was significantly higher with an extremely low p-value of 0.0000171. This was one of the most significant differences found between the FTP and the MA group. Too few of the students had ACT scores to perform a valid t-test to make a statement about

significance. However, if the sample data were assumed to be normal, then there would have been a very significant difference between the FTP group and the MA group. See Table 9. It is not surprising that students who performed better on these standardized tests would also be first time passers since the NBCOT exam is also a standardized test.

Table 8*SAT Score*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	1055.714	974.5714
Variance	11344.09	8619.664
Observations	140	35
P(T<=t) one-tail	0.000017	

Table 9*ACT Score*

INVALID t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	23.26506	21.6087
Variance	9.489862	3.339921
Observations	83	23
P(T<=t) one-tail	0.000944	

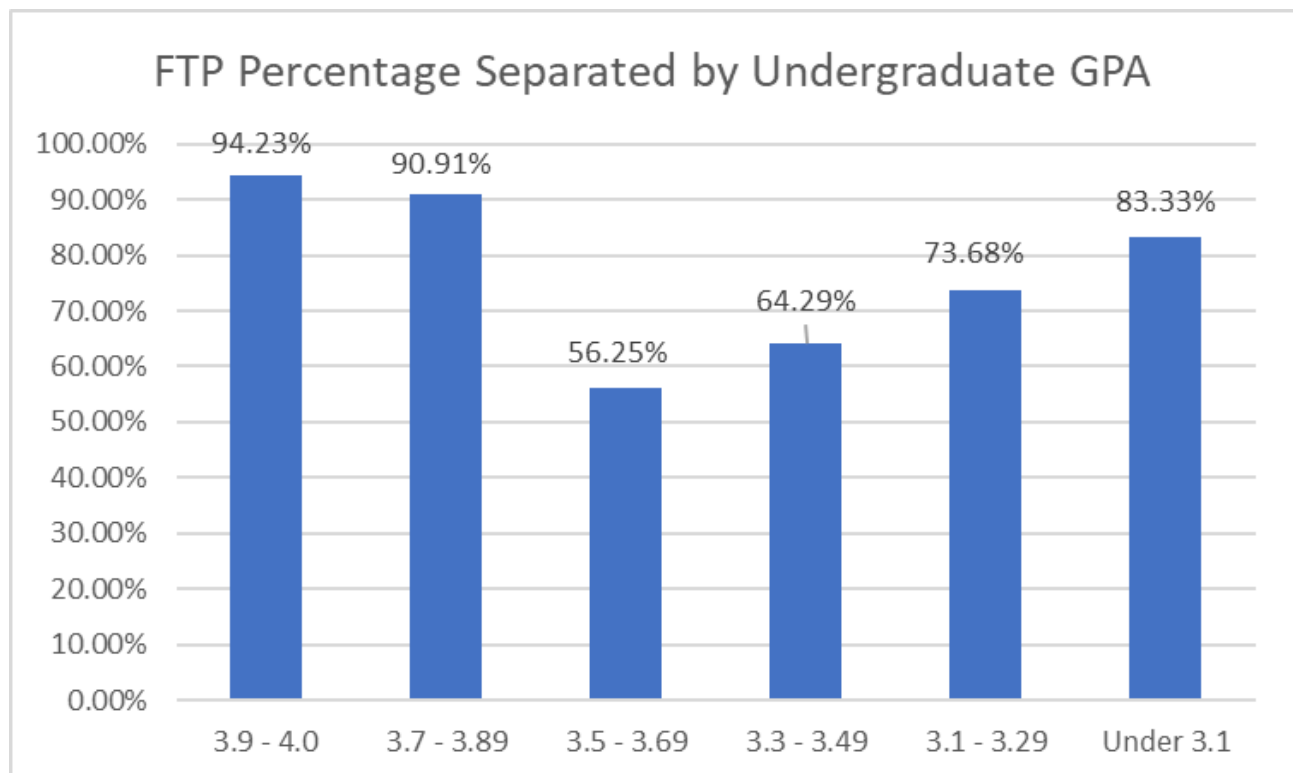
Undergraduate GPA

There were 243 students who had a recorded uGPA. The FTP group had a higher average uGPA compared to the MA group with an extremely low p-value of 0.00002. Though this is not surprising, it was also one of the most statistically significant differences that was observed. See Table 10. Undergraduate GPA can be an excellent predictor of first-time passing success. The percentage of people who passed on the first attempt went from 92.25% for students whose BS GPA was greater than or equal to 3.7 to only 64.04% for students whose BS GPA was less than 3.7.

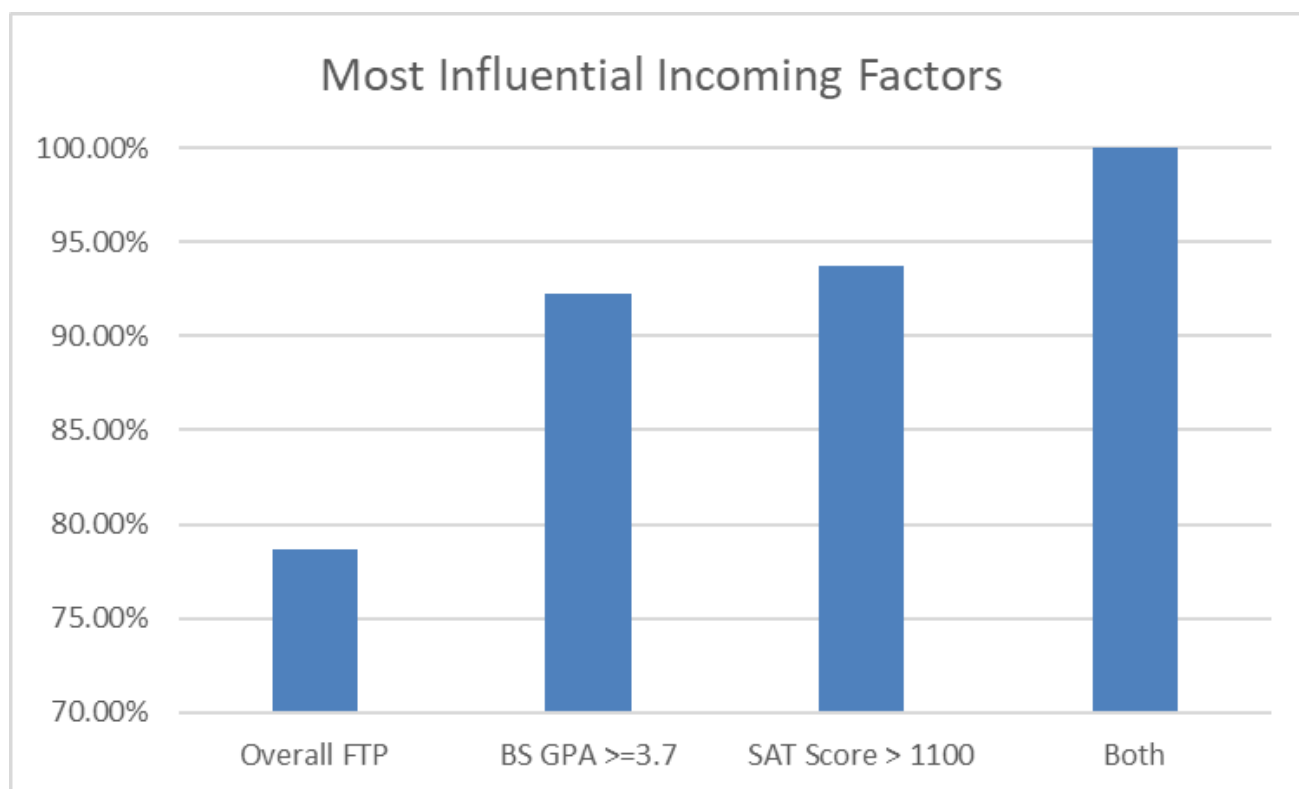
Table 10*Undergraduate GPA*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	3.696713542	3.547039216
Variance	0.068384436	0.043563678
Observations	192	51
P(T<=t) one-tail	0.0000203487	

For a closer examination of FTP broken down by uGPA, see Figure 1. Clearly, the percentage of FTP dropped significantly as the students' GPA dropped below 3.7.

Figure 1*FTP Percentage Separated by uGPA*

Combining two of the most significant characteristics of success, uGPA and SAT score, the following gives a strong indicator of a student's ability to be a first-time passer. As Figure 2 shows, more than 90% of all students whose BS GPA was at least 3.7 were first-time passers, and the results were similar for those students whose SAT score was greater than 1100. One hundred percent of students who met both incoming metrics were FTP. There were 35 in this group out of the entire cohort.

Figure 2*Most Influential Incoming Factors*

Not surprisingly, students with a high GPA or a high SAT score were much more likely to be first-time passers.

OT Program Course Grades

Ten OT program courses were examined. In each class, the group who earned an A (A+, A, or A-) was compared to the group that did not. Here are the results in order of significance. These six classes were such that the groups that earned an A were significantly more likely to be FTP. See Table 11.

These results demonstrate strong indicators of being a successful first-time passer. For instance, students who earned an A in OT Physical Disabilities 2 Lecture were over 51% more likely to be first-time passers than those that did not. Similarly, students who earned an A in OT Physical Disabilities 1 Lecture were over 40% more likely to be first-time passers than those that did not. Students who got an A in these classes had significantly better chances of being in the FTP group. Four classes did not present a significant difference in FTP based on students' grades. All of the corresponding p-values did not meet the 0.05 threshold. See Table 12.

Table 11*OT Program Course Grades*

	p-value	Percentage Point Increase	Percentage Increase
OT Physical Disability 2 Lecture	<0.0001	29.54%	51.15%
OT Physical Disability 1 Lecture	<0.0001	24.79%	40.90%
Clinical Neuroscience	0.00023	18.38%	26.48%
OT Pediatrics 2 Lecture	0.00062	18.00%	26.99%
OT Pediatrics 1 Lecture	0.04121	10.25%	14.39%
OT Neurorehabilitation Lecture	0.00144	18.15%	27.93%

Table 12*Other OT Program Course Grades*

	p-value
OT Psychosocial 1 Lecture	0.4086
OT Psychosocial 2 Lecture	0.3046
Gerontology	0.06036
Community	0.5000

Level II Fieldwork Course Scores

There were 242 students who had Level IIa fieldwork scores, and the sample data is listed in Table 13. There was not significant evidence that the average Level IIa fieldwork total score was higher for FTP students than for MA students. The p-value was 0.060718 which was close to the 0.05 threshold, but still not significant. There were 241 students who had Level IIb fieldwork scores, and the sample data is listed in Table 14. There was not significant evidence that the average Level IIb fieldwork total score was higher for FTP students than for MA students. The p-value was 0.325465 which was not close to reaching a level of significance.

Table 13*Level IIa Fieldwork Scores*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	143.2853	139.9118
Variance	178.0774	189.1171
Observations	191	51
P(T<=t) one-tail	0.060718	

Table 14*Level IIb Fieldwork Scores*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	143.0423	142.1538
Variance	151.8067	157.2308
Observations	189	52
P(T<=t) one-tail	0.325465	

When analyzing all Level II fieldwork categories separately, only one category showed significant differences between the FTP group and the MA group. This was the communication score on Level IIa fieldwork only. The FTP group had an average score of 13.85 while the MA group had an average score of 13.29. The corresponding p-value is 0.0243. It looks like the main reason that this relatively small difference in average scores between the groups was statistically significant was that the scores had such a small standard deviation. This does not seem to be a compelling result.

OTKE Test Performance

Of all the variables examined in this study, one of the most significant differences between the FTP group and the MA group was the overall percentage correct on the OTKE test. Of the 192 students who had OTKE test data, 142 were FTP and 50 were MA. The p-value associated with this difference is close to zero. See Table 15.

Table 15*OTKE Test Percentage Correct*

t-Test: Two-Sample Assuming Unequal Variances		
	<i>FTP</i>	<i>MA</i>
Mean	62.63021%	57.3200%
Variance	0.003799	0.005373
Observations	192	50
P(T<=t) one-tail	0.0000104685	

However, each individual domain and task from the test was also analyzed, and the FTP group scored significantly higher than the MA group in the following five areas:

- Domain 3 Task 1 (D3T1): Manage interventions for the infant, child, or adolescent client, using clinical reasoning, the intervention plan, and best practice standards consistent with pediatric conditions and typical developmental milestones in order to support participation within areas of occupation (OTKE cohorts prior to 2019).
- Domain 3 Task 2 (D3T2): Manage interventions for the young, middle aged, or older adult client, using clinical reasoning, the intervention plan, and best practice standards consistent with general medical, neurological, and musculoskeletal conditions in order to achieve functional outcomes within areas of occupation (OTKE cohorts prior to 2019).
- Domain 3 Task 3 (D3T3): Manage interventions for the young, middle aged and older adult client, using clinical reasoning, the intervention plan, and best practice standards consistent with psychosocial, cognitive, and developmental abilities in order to achieve functional outcomes within areas of occupation (OTKE cohorts prior to 2019).
- Domain 4 Task 1 (D4T1): Maintain and enhance competence, using professional development activities relevant to practice, job responsibilities, and regulatory body in order to provide evidence-based services (OTKE cohorts prior to 2019).
- 2019 Domain 3 Task 2 (19D3T2): Implement occupational based strategies to support participation in activities of daily living, instrumental activities of daily living, rest and sleep, education, work, play, leisure, and social participation across the lifespan (2019 OTKE cohort).

The p-values associated with the t-test are listed in Table 16.

Table 16*OTKE Scores*

OTKE Domains	OTKE Scores				
	D3T1	D3T2	D3T3	D4T1	19D3T2
Associated p-value	0.000526	0.00411	0.00153	0.00974	0.035966

Results Overview

In our sample, the following variables were significantly higher in the FTP compared to the MA group.

- High School GPA
- SAT Scores
- Whether or not the student earned an A in High School Chemistry or Biology
- Whether or not the student took High School Physics
- Undergraduate GPA
- Whether or not the student earned an A in the following six OT courses: OT Physical Disabilities 2 Lecture, OT Physical Disabilities 1 Lecture, Clinical Neuroscience, OT Pediatrics 2 Lecture, OT Neurorehabilitation Lecture, OT Pediatrics 1 Lecture
- Percentage Correct for the OTKE Test
- Communication score on Level IIa fieldwork

In our sample, the following variables were NOT significantly higher in the FTP compared to the MA group.

- Whether or not the student earned an A in the following four OT courses: OT Psychosocial 1 Lecture, OT Psychosocial 2 Lecture, Gerontology, Community
- Fieldwork II Course Scores

No statistically appropriate comparison could be made, in our sample, about the differences between the FTP and the MA groups for the following variables because of low sample size.

- ACT Score
- Gender

Discussion

High School Factors

While there is currently a gap in the literature linking high school cognitive factors to NBCOT exam FTP rate, our current study did reveal students with an average hsGPA of 3.7 or higher were more likely to pass their certification exam on the first try. A similar study by Kurowski-Burt et al. (2020) determined that an average hsGPA of at least 3.6 was not a significant factor in passing the NBCOT exam the first time. Their study variables were similar to our study, but their study aimed to develop a predictive tool for academic advising to support positive outcomes on the NBCOT exam. In addition, their study demographic was post baccalaureate students only, and our study had a mix of post baccalaureate and undergraduate students. Also, their students graduated between 2009-2017 as compared to our study's students who took the NBCOT exam between 2015 and 2021. Despite these differences, if we compare the results of both studies, we could surmise that an average hsGPA of at least 3.7 can facilitate first time pass success.

Our study also indicates those who earned As in high school physics, chemistry, or biology were also more likely to be first time passers. These findings are consistent with previous studies that indicate the influence of cognitive variables on exam success. For example, Salvatore (2002) determined that cognitive variables have been shown to be one of the best predictors of academic achievement in the health professions. Further, Khan-Farooqi (2020) found the cognitive variables of GRE verbal reasoning scores and program GPA were statistically significant predictors of first attempt NBCOT exam success. While the Salvatore and Khan-Farooqi studies did not address high school factors, their results and ours add to the body of literature revealing the strong connection between cognitive variables and FTP rate.

The hsGPA and science course results of our study could help OT programs reassess their admission requirements and identify students who may need more intensive advising and support throughout the OT curriculum. Regarding high school science courses, most high school students are required to take physical science and basic life sciences, but they are not always required to take more than two of them. Therefore, some students enter college without taking all three of these courses. For example, in our study, not all students took a physics class. But we know that students who took a physics course were more likely to be in the FTP group than those who did not. And those who earned an A in physics were even more likely to be in the FTP group. While we are unsure if it is early exposure to the content, the content itself, or the rigor of the content that contributed to these results, at a minimum, requiring all three science courses for admission to an OT program could give students a better chance of passing the NBCOT exam on the first try.

One of the most significant differences between the FTP and MA groups in our study was their score on the SAT. More than 90% of students who scored at least 1100 on the SAT were first time passers. This finding confirms what previous studies also found: that pre-admission standardized tests are excellent predictors of future certification exam

performance (Khan-Farooqi, 2020; Kurowski-Burt et al., 2020; Roman & Buman, 2019; Utzman et al., 2007). It makes sense that students who perform well on previous standardized tests are good test takers and thus would perform well on future standardized tests when compared to their peers who have less success with standardized tests in general. Similarly, a systematic review completed in 2021 by Spohn et al, identified variables that have been found to predict passing credentialing exams in several other healthcare professions, related most commonly to clinician credentials. They found that admission GPA, cumulative GPA, overall GPA, course grades, completion of preparatory courses, age, grit, deliberately practicing, participating in a mentoring program, and GRE performance were all factors for passing certification exams. While this study also analyzed non-cognitive factors and did not look specifically at FTP rates, it does strengthen the discussion that those with higher grades/scores are more successful in future credentialing examinations.

The information in our study related to high school variables could sway educators to raise hsGPA and SAT requirements to enter their university OT program in the hopes this could help with FTP success. However, this could be a barrier to enrollment and inclusivity. While this study's results indicate higher hsGPA and SAT scores over 1100 positively contribute to FTP, there are still students with lower hsGPAs who pass the test on the first try. And many students successfully pass the test after multiple tries regardless of their hsGPA. Raising these admission requirements to enter a program could ultimately prevent students from entering the OT major and thus the profession.

Undergraduate Program Factors

Our study discovered that students who earned an A in OT intervention courses, specifically Physical Disabilities I and II lectures and Pediatrics I and II lectures, had a significantly better chance of becoming first time passers. It was surprising to the researchers that grades in core OT program courses like Psychosocial Intervention in OT, Community Intervention, and Gerontology did not influence FTP in this study. However, a possible reason for this could be that almost everyone earned an A in these classes. Both the FTP group and the MA group had extremely high rates of students earning an A in these courses.

These findings could be explained if we consider the content of the NBCOT exam. The exam is created from a practice analysis survey which is completed every five years. This analysis determines "the domains, tasks, and knowledge needed to effectively practice occupational therapy" (NBCOT, 2024). In essence, NBCOT researchers survey current practitioners to determine what knowledge and skills are needed for an occupational therapist entering the profession to have. The results of this survey and thus the NBCOT exam content are obviously influenced by it. A larger percentage of content items fit into the Domain 3 category which, at the time of our study, is Intervention Management. The students in the FTP group of our study earned As in many of the program's intervention courses indicating they had an above average grasp of intervention planning and management across the lifespan. And thus, could have performed well on these types of NBCOT exam questions which were a large percentage of the exam.

It will be important for programs to be cognizant of the NBCOT exam content and ensure that their curriculum is aligned with the domains ultimately being tested while being cautious not to take out content that has less representation on the exam. Especially since the profession continues to expand into new areas of practice. Teaching only for the NBCOT exam could stifle this growth. Truskowski (2016) found that the number of credits in the curriculum does not influence student NBCOT exam performance. Therefore, when modifying OT curriculum, faculty should consider that the type of course content is more important than the amount of content.

The current study also determined that uGPA can be an excellent predictor of first-time passing success. The percentage of people who pass on the first attempt went from 92.25% for students whose uGPA is greater than or equal to 3.7 to only 64.04% for students whose uGPA is less than 3.7. This finding aligns with the Novalis et al. (2017) study that indicates past academic performance predicts future success. Their study findings indicated that uGPA was not a significant factor in predicting FTP or MA, but findings did indicate that their students' MOT program GPA was a significant factor in predicting FTP or MA. This does align with our study because the majority of our students followed our accelerated five-year path in which half of their uGPA was OT coursework. The link between uGPA and FTP could spur program faculty to identify students who have a uGPA of less than 3.7 upon entry to the graduate portion of the program so they could offer additional supports, for the remainder of the program, around exam preparation to potentially facilitate these students' success in passing on the first try.

Our study did not find any significance between Level II fieldwork scores and FTP rate. This contrasts with the study by Kurowski-Burt et al. (2020) where they determined that a key difference for their FTP group was the first Level II fieldwork score. They stated that "academic course grades, fieldwork performance, and standardized test scores affect performance on the NBCOT licensure exam" (p.8). Our Level IIa fieldwork p value was close to significant, therefore it is possible that with an expanded population, significance could have been reached and similar results would have been found.

OTKE Scores

Our study revealed another of the most significant findings to be the overall percentage of answers correct on the OTKE in the FTP group. This makes sense as this is a pre-test for the OT certification exam and is modeled after the actual exam areas of focus. In the study by Wilson et al. (2021), the OTKE was found to be the only statistically significant score to predict success on the NBCOT exam which aligns with our study's results. Student performance on the OTKE can be used to establish individualized study plans for success on the certification exam. Students can focus their time and efforts studying domain areas they struggled with on the OTKE.

Each OTKE domain and task area was also assessed in our study. It was found that students who were in the FTP group scored significantly higher than the students in the MA group in five areas. Four of these five areas are in the domain of intervention

management and can also be linked to success in intervention classes. Program faculty can use their student cohorts' OTKE data as a tool to ensure the curriculum is covering content well enough for their graduates to be successful on the NBCOT exam. If there are areas the students collectively are scoring low on, this content can be re-worked in the curriculum to hopefully improve their first-time pass rate and overall quality of graduates' clinical performance once in the field.

Limitations

This retrospective data analysis only analyzed data from one accelerated five-year MSOT program in one region of the U.S. Further, the data analyzed in this study was not solely from a post baccalaureate program or direct entry from a high school program. Because the data was from a mix of students entering the program at different times, not all students were included in each section of data analysis. For example, post baccalaureate students did not have high school grades to analyze but freshman year entry students did. So only direct entry from high school students' data was included in the analysis of high school grades. On the other hand, several of the study's data did group all students together regardless of their point of entry into the program. For example, all students took OT curriculum content starting in the third year of the program until graduation. Therefore, all students regardless of program entry, were included in the analysis of OT program course grades. Because of this mix of students, generalizing this study's results to all university OT programs should be done with caution. The university was also limited in its demographic diversity especially in race, ethnicity, and gender; the group of students sampled for this study was largely made up of Caucasian females. The university is a private, non-profit university which could also be considered a limitation in the sample used. The study did not analyze all high school courses which may have limited the full scope of data and therefore abilities of the students sampled and produced a narrow data set. Undergraduate liberal arts courses were not analyzed as researchers assumed the results would not yield any correlations. This study did not focus on OTA students and thus the information may not be generalized to OTA student performance on the NBCOT exam. Overall, a deeper and larger scoping data set from a more diverse subject group may or may not show different findings related to student success in passing the NBCOT exam the first time.

While our study results did align with similar studies predicting FTP on the NBCOT exam (Kuroski-Burt et al., 2020; Novalis et al., 2017; Wilson et al., 2021), it is important to note that the timing of the exams varied, therefore, so did the NBCOT exam blueprint the students were tested on. This could be an ongoing limitation to determining what variables predict FTP on the NBCOT exam. On the contrary, if similar results have been shown across time and exams, this could strengthen the findings.

Implications for Occupational Therapy Education

Overall, the results of this study can inform OT programs' admissions standards and help educators prepare students for future success on the NBCOT exam. For example, OT educators can guide local high school teachers to begin preparing students for success even before they enter an OT program. Teachers can encourage students in middle and/or high school who are interested in healthcare professions to take more

science courses than required. Aspiring future occupational therapists in high school could engage in extra academic activities like science, technology, engineering and math (STEM) activities, biology club, or volunteering within programs in the science fields to also prepare them for success in the courses that influenced NBCOT FTP rates in this study. Also, while OT educators most likely already provide support for their OT students throughout their curriculum, being more proactive with students who may display signs of needing multiple attempts on the exam is a great idea. Some areas to facilitate could be time management, study tips, stress reduction, content prioritization, and life balance. Occupational therapy educators can consider additional student supports like enhanced academic advising, OT student peer mentorship, and faculty training related to NBCOT exam structure to enhance FTP rates. Occupational therapy educators can also focus attention early in the curriculum on helping students learn to study to support retention across time as programs scaffold learning throughout several years and information needs to be retained for success on the NBCOT exam.

Future Research

Future research opportunities are vast in this area of study. Stress management levels and first-time pass rate can be compared to all the variables and data analyzed in this study to look at non-cognitive factors impacting pass rate. Further research could answer questions related to the impact of stress and anxiety levels on FTP rate, and further investigate the application of stress management programs to support FTP rates (Bueno, 2021). Students who passed the first time could be surveyed to determine what factors they believe led to their success on the exam. More comparisons could be made by selecting a greater variety of high school courses to compare to (psychology for example). Further in-depth research looking at math versus reading/writing proficiency scores on the SAT and FTP would be interesting to investigate. It could allow OT program faculty to alter admission criteria if higher scores in math or writing indicate FTP rate ability. Researchers could sort a variety of demographic data to compare in a larger and more diverse sample size. Research could expand to study comparisons with gender, race, IQ, personality traits, self-efficacy and even comparing other college major's data to OT student data surrounding FTP in students taking any healthcare professional board examination. Future research can help to support preferences and theories surrounding admission requirements for students enrolling in higher education institutions. Results of these studies could influence retention and graduation rates across many different OT programs (associate, master level, doctoral level) and other healthcare profession programs. Comparisons can be made to inform students and universities deciding between offering an OT associate degree program, masters, or doctoral degree program to predict success for students trying to decide which degree to obtain to support later FTP on board exams.

Conclusion

The literature does support that uGPA is a good indicator of FTP for OT students taking the NBCOT exam and it also correlates to the findings in our study. Our study's findings add to the body of knowledge and support the expected influence of hsGPA, high school and OT program course grades, SAT score and OTKE success on students who pass the boards the first time. Letter grades of an A in high school physics, chemistry

and biology, and a high school GPA of 3.7 or higher, were areas of cognitive ability where there were gaps in research that this study's results may be helping to close by showing these groups of students are more apt to pass the NBCOT board exam on their first try. Educators should continue to consider and research the impact of non-cognitive factors like management of anxiety in student populations with its impact on achievement and the influence of student advising and support systems at institutions for academic success. Occupational therapy educators can consider student supports like enhanced academic advising, OT student peer mentorship and faculty training related to NBCOT exam structure to enhance first time pass rates. This study challenges the trend of not requiring the cognitive variable of SAT score for admission into higher education institutions as OT students who scored an 1100 or higher on their SAT in this study were significantly more likely to pass the NBCOT exam on their first try. This study encourages MSOT students to achieve an A in coursework related to Physical Disabilities, Pediatrics and Neuroscience to influence first time passing in a positive direction. Educators should understand that grades and passing scores on a board exam do not guarantee a successful healthcare professional but appear to be influential in first time pass rates of the students in this study. The study helps to inform not only higher education institutions and OT educators on the future influence of admission criteria on first time pass rates, but also students and programs striving to achieve high first-time pass rates and subsequently OT practitioners who help their clients achieve their goals.

References

- ACOTE. (2023, October 20). *Standards and interpretive guide*. <https://acoteonline.org/accreditation-explained/standards/>
- Andreeff, R. (2014). Predictors of student success on the physician assistant national certifying examination. *Journal of Physician Assistant Education*, 25(3). <https://doi.org/10.1097/01367895-201425030-00008>
- Avi-Itzhak, T. (2015). Ability of the National Board for Certification in Occupational Therapy practice test to estimate the probability of first-time pass status on the national certification exam. *American Journal of Occupational Therapy*, 69(Supplement 2), 6912185080. <https://doi.org/10.5014/ajot.2015.015024>
- Beeman, P.B., & Waterhouse, J.K. (2001). NCLEX-RN performance: Predicting success on the computerized examination. *Journal of Professional Nursing* 17(4), 158-165. <https://doi.org/10.1053/jpnu.2001.24860>
- Bonsaksen, T., Brown, T., Lim, H. B., & Fong, K. (2017). Approaches to studying predict academic performance in undergraduate occupational therapy students: A cross-cultural study. *BMC Medical Education*, 17(1). <https://doi.org/10.1186/s12909-017-0914-3>
- Breen-Franklin, A., & Bonsaksen, T. (2021). Associations between study approaches and exam grades among occupational therapy students in the United States. *Irish Journal of Occupational Therapy*, 49(1), 36-40. <https://doi.org/10.1108/IJOT-09-2020-0013>

- Bueno, D. (2021, February 11). *Exams as a source of stress: How assessments may affect learning, through stress*. IBRO/IBE-UNESCO Science of Learning Briefings. <https://solportal.ibe-unesco.org/articles/exams-as-a-source-of-stress-how-assessments-may-affect-learning-through-stress/>
- Cook, C., Engelhard, C., Landry, M., & McCallum, C. (2015). Modifiable variables in physical therapy education programs associated with first-time and three-year National Physical Therapy Examination pass rates in the United States. *Journal of Educational Evaluation for Health Professions*, 12(44). <https://doi.org/10.3352/jeehp.2015.12.44>
- Dockter, M. (2001). An analysis of physical therapy preadmission factors on academic success and success on the national licensing examination. *Journal of Physical Therapy Education* 15(1), 60-64. <https://doi.org/10.1097/00001416-200101000-00010>
- Jones, P. E., Simpkins, S., & Hocking, J. A. (2014). Imperfect physician and physical therapist admissions processes in the United States. *Journal of Educational Evaluation for Health Professions*, 11(11). <https://doi.org/10.3352/jeehp.2014.11.11>
- Khan-Farooqi, L. (2020). Predictors of success on the National Board for Certification in Occupational Therapy Exam. *Walden Dissertations and Doctoral Studies*. 9390. <https://scholarworks.waldenu.edu/dissertations/9390>
- Kurowski-Burt, A. L., Woods, S., Daily, S. M., Lilly, C. L., Sciafe, B., & Davis, D. (2020). Brief Report—Predicting student success on the National Board for Certification in Occupational Therapy Examination. *American Journal of Occupational Therapy*, 74(4), 7404345020. <https://doi.org/10.5014/ajot.2020.037622>
- NBCOT. (2024, January 4). *Practice analysis*. <https://www.nbcot.org/exam-info/practice-analysis>
- NBCOT. (2023, October 20). *Certification exam handbook*. https://www.nbcot.org/-/media/PDFs/Cert_Exam_Handbook.pdf
- New York Times. (2020). *More colleges are waiving SAT and ACT requirements*. Retrieved 6/2/2022. <https://www.nytimes.com/article/sat-act-test-optional-colleges-coronavirus.html>
- Novalis, S. D., Cyranowski, J. M., & Dolhi, C. D. (2017) Passing the NBCOT Examination: Preadmission, academic, and fieldwork factors. *Open Journal of Occupational Therapy*, 5(4). <https://doi.org/10.15453/2168-6408.1341>
- O'Brien, J.C., & Conners, B.L. (2024). *Introduction to occupational therapy* (6th ed.). Elsevier. ISBN: 978-0-323-79856-3
- Roman, G., & Buman, M. P. (2019). Preadmission predictors of graduation success from a physical therapy education program in the United States. *Journal of Educational Evaluation for Health Professions*, 16(5). <https://doi.org/10.3352/jeehp.2019.16.5>
- Salvatori, P. (2001). Reliability and validity of admissions tools used to select students for the health professions. *Advances in Health Sciences Education*, 6, 159-175. <https://doi.org/10.1023/a:1011489618208>

- Spohn, R., Schweinle, W., Berg-Poppe, P., South-Winter, C., & DeJong, D. (2021). Factors for successfully passing certification exams: A systematic review. *Perspectives in Health Information Management*, 18(4).
<https://doi.org/10.15453/2168-6408.1160>
- Truskowski, S. (2016). Exploring the relationship between entry-level master's program class size and the number of graduate credits offered and aggregate NBCOT pass rates. *Open Journal of Occupational Therapy*, 4(2).
<https://doi.org/10.15453/2168-6408.1160>
- Utzman, R. R., Riddle, D. L., & Jewell, D. V. (2007). Use of demographic and quantitative admissions data to predict performance on the National Physical Therapy Examination. *Physical Therapy*, 87(9), 1181-1193.
<https://doi.org/10.2522/ptj.20060222>
- Wilson, R., Mekonnen, H., Gaatz, A., Holmgren, E., Lemley, K., & Berrios Barillas, R. (2021). What are predictors for passing the OT Licensing Exam? *American Journal of Occupational Therapy*, 75(Supplement 2).
<https://doi.org/10.5014/ajot.2021.75S2-RP36>
- Wolden, M., Hill, B., & Voorhees, S. (2019). Predicting success for student physical therapists on the National Physical Therapy Examination: Systematic review and meta-analysis. *Physical Therapy*, 100(1), 73-89.
<https://doi.org/10.1093/ptj/pzz145>