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## Pre-entry Selection Assessment Results and Final Degree Outcomes of Occupational Therapy Students: Are There Relationships?

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## Abstract

Occupational therapy (OT) admissions tutors are tasked with ensuring the recruitment of high-quality candidates who can demonstrate both academic and professional skills throughout their education and subsequently into practice. While standardized admissions criteria do not exist, it is widely accepted that both cognitive and non-cognitive characteristics should be assessed to establish academic and professional qualities of applicants. Pre-admission qualifications are generally classed as a reliable assessment of academic (cognitive) ability, with literature supporting positive but variable relationships between academic qualifications and degree classifications. Evidence to support trusted assessments of pre-admission professional (non-cognitive) skills is lacking, with ambiguity surrounding relationships between pre-admission results and graduation data. This paper compares outcomes of cumulative cognitive and non-cognitive assessments for one cohort ( $n=44$ ) of pre-registration BSc (Hons) OT students at one United Kingdom (UK) university, with final degree outcomes. Quantitative methods were employed to explore potential relationships between numerical pre-admission and graduation data. Correlations were not found between a) pre-entry qualifications and final degree classifications or b) selection assessment scores and final degree classifications. Nine candidates did not meet the university's minimum cognitive ( $n=3$ ) or non-cognitive criteria ( $n=6$ ) but were granted admission. All nine went on to graduate with a range of degree classifications preventing a loss to the university and OT profession. Results demonstrate pre-entry data is not necessarily a predictor of graduation outcomes, indicating further research into the variables which impact a student's journey between admission and graduation is warranted.

## Keywords

Occupational therapy, admission criteria, selection, graduation outcomes

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## Pre-entry Selection Assessment Results and Final Degree Outcomes of Occupational Therapy Students: Are There Relationships?

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### ABSTRACT

Occupational therapy (OT) admissions tutors are tasked with ensuring the recruitment of high-quality candidates who can demonstrate both academic and professional skills throughout their education and subsequently into practice. While standardized admissions criteria do not exist, it is widely accepted that both cognitive and non-cognitive characteristics should be assessed to establish academic and professional qualities of applicants. Pre-admission qualifications are generally classed as a reliable assessment of academic (cognitive) ability, with literature supporting positive but variable relationships between academic qualifications and degree classifications. Evidence to support trusted assessments of pre-admission professional (non-cognitive) skills is lacking, with ambiguity surrounding relationships between pre-admission results and graduation data. This paper compares outcomes of cumulative cognitive and non-cognitive assessments for one cohort ( $n=44$ ) of pre-registration BSc (Hons) OT students at one United Kingdom (UK) university, with final degree outcomes. Quantitative methods were employed to explore potential relationships between numerical pre-admission and graduation data. Correlations were not found between a) pre-entry qualifications and final degree classifications or b) selection assessment scores and final degree classifications. Nine candidates did not meet the university's minimum cognitive ( $n=3$ ) or non-cognitive criteria ( $n=6$ ) but were granted admission. All nine went on to graduate with a range of degree classifications preventing a loss to the university and OT profession. Results demonstrate pre-entry data is not necessarily a predictor of graduation outcomes, indicating further research into the variables which impact a student's journey between admission and graduation is warranted.

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Thirty-five United Kingdom (UK) universities are authorized to deliver educational occupational therapy (OT) programs (Royal College of Occupational Therapists [RCOT], 2019b). Neither the RCOT nor the Health and Care Professions Council (HCPC) as the professional and governing bodies of OT in the UK stipulate standardized admissions criteria. Furthermore, the HCPC (2017) merely state “selection and entry criteria must include appropriate academic and professional entry standards” (p. 4), offering no guidance on what these are or how they should be assessed, measured or recorded at selection. A lack of standardized entry criteria for OT programs results in bespoke but inconsistent selection processes between universities, making it difficult to identify universal characteristics that may contribute to the success of students across academic and professional contexts.

Health care professions literature accepts that in order for candidates to succeed academically and professionally, cognitive (academic) and non-cognitive (professional) characteristics should be assessed (Salvatori, 2001). Cognitive assessment is dominated by entry-level academic qualifications (Huws, Reddy, & Talcott, 2010; Timer & Clauson, 2011), with evidence supporting positive, albeit variable, correlations between pre-admission qualifications and final degree classifications (Chapman, 1996; King & Aves, 2012; Salvatori, 2001). Assessment of non-cognitive attributes and how they relate to academic and professional performance remains contested with a lack of accepted, valid and reliable selection tools to identify qualities such as work experience, communication skills, emotional intelligence, motivation, ethical awareness and empathy (Posthuma & Sommerfreund, 1985; Salvatori, 2001; Timer & Clauson, 2011).

Occupational therapy admissions tutors are tasked with screening and selecting high-quality OT students who can perform both academically and professionally throughout their education and into subsequent practice. In pursuit of these candidates, this paper will:

1. Explore the literature related to academic (cognitive) and professional (non-cognitive) pre-admission selection procedures to establish what assessment, measurement and recording tools are considered effective predictors of graduation success in OT.
2. Compare cumulative academic and professional selection assessment scores for a single cohort of OT students that formed the basis of entry to one UK university in 2016, with final degree percentages and classifications awarded in 2019.
3. Consider the findings of one and two and explore whether there are considered relationship(s) between pre-entry selection assessment results and final degree outcomes of OT students.

## **Literature Review**

### **Academic (Cognitive) Entry Standards**

Many UK universities, including the one used in this study, base undergraduate degree admissions decisions on pre-entry qualifications such as the two year advanced-level (A-Level), taken at the age of 18 years (Birch & Rienties, 2014). This seems appropriate when significant (yet variable) positive correlations between pre-entry qualifications and

final degree classifications across a broad range of subjects are considered (Chapman, 1996; King & Aves, 2012). Universities and College Admissions Service (UCAS) tariff points (the translation of qualifications and grades into a numerical value for the purposes of course entry requirements) continue to be a significant driver of degree success in undergraduate UK students with the caveat that “significance and impact on degree success vary across universities” (UK Standing Committee for Quality Assessment, 2018, p. 33). This variance is further evidenced by two single-site universities, which identified no correlation between academic pre-entry grades and degree classifications for engineering and psychology students (Birch & Rienties, 2014; Huws et al., 2010). Outside of the UK, the literature supports previous academic performance (pre-admission Grade Point Average (P-GPA) and Graduate Record Examination (GRE) as variable predictors of academic success between admission and the point of graduation (Kreiter & Kreiter, 2007; Salvatori, 2001; Siu & Reiter, 2009). While combined evidence from a range of educational literature supports the use of pre-admission qualifications as a likely predictor of student academic ability, contemporary UK and United States of America (USA) research specific to the OT process of recruitment and admissions is sparse (Li et al., 2017; Lysaght et al., 2009).

### ***USA and Canada***

Posthuma and Sommerfreund (1985) compared pre-selection interview scores and academic qualifications for 48 students entering an entry-level OT program from high school against 31 students entering the same program from university. They sought to ascertain if the interview scores and qualifications offered better predictions of academic success as a combination or in isolation. Results indicated that for university students, academic qualifications were the best predictor of academic results, whereas for high school students, a combination of qualifications and interview was recommended. Further to this, Posthuma and Noh (1990) examined academic and fieldwork performance in high school ( $n=17$ ) and university ( $n=15$ ) students admitted to an entry-level OT program based on either a) highest pre-admission academic grades or b) highest interview scores. No significant differences were found between the two groups' final academic grades at the end of the program, with no significant correlations found between high interview scores or high grades at admission and final academic performance.

As OT education in the USA made the transition from baccalaureate to master's entry-level programs, significant positive correlations between P-GPA and/ or GRE scores and GPA in OT courses (OT-GPA) were found across several sites for cohorts ranging from 45-129 (Katz & Mosey, 1980; Kirchner & Holm, 1997; Kirchner et al., 2001; Lysaght et al., 2009). A further contemporary review of academic admissions requirements across American Occupational Therapy Association (AOTA) accredited programs revealed the majority of responding programs require evidence of minimum P-GPA scores (master's, 99.4%,  $n=155$ ; doctoral, 100%,  $n=16$ ) and submission of at least one GRE score (master's, 53.9%,  $n=84$ ; doctoral, 68.8%,  $n=11$ ), thus contributing to the weight of argument to support the use of the GPA and GRE as predictive tools of academic success (Bowyer et al., 2018).

### **United Kingdom**

Occupational therapy education in the UK currently offers programs via Bachelor of Science (BSc) (with honors) and Master of Science (MSc) routes, with no requirement for entry-level students to study to MSc or doctoral level in order to practice. As with the North American literature, UK research is limited and dated. Two groups of students admitted to one Diploma of the College of Occupational Therapists (DipCOT) program over a seven year period were compared. Students were admitted to the program with either an ordinary-level (O-Level) high school certificate (taken at aged 16 years) ( $n=193$ ) or an A-Level college qualification ( $n=193$ ) in science (biology or human biology) and compared against first year OT anatomy and physiology (A&P) exam scores (Tyldesley, 1986). Results found the A-Level group yielded significantly better scores in an initial A&P exam but that this difference did not transcend to the end of year A&P exam results. With the exception of one academic year, the study found no significant difference between the two groups, concluding that while a science qualification may be helpful in the initial stages, it is unlikely to be an essential prerequisite for OT training (Tyldesley, 1986).

In the mid-1990's the DipCOT was replaced by the BSc (Royal College of Occupational Therapists, 2019a), and investigations into the considered ability of pre-admission qualifications to predict graduation outcomes continued. Two studies at one university found no significant correlations between age at entry, academic qualifications (gained via traditional A-Levels or non-traditional Access to Higher Education routes) and final degree classifications for 96 OT students admitted over five consecutive cohorts (Howard & Jerosch-Herold, 2000; Howard & Watson, 1998). Mature age (over 21 years) at entry was also found not to be a predictor of greater degree success for 425 ( $n=171$  under 21 years;  $n=254$  over 21 years) graduating OT students from twelve UK universities. Rather, those students ( $n=70$ ) entering OT education with a previous university degree, and therefore mature in age by default, gained significantly better results at graduation over those students entering without university experience (Shanahan, 2004).

These studies share common limitations related to their contemporary relevance, small sample sizes from single-site institutions and variability of academic entry standards (Lysaght et al., 2009; Posthuma & Sommerfreund, 1985). However, when reviewed as a collective, the variable correlations uncovered appear to challenge the wider medical and health literature that affirms "the evidence is *overwhelmingly clear* that pre-admission academic grades predict subsequent in-course academic performance in all professional disciplines" (Salvatori, 2001, p. 161).

### **Professional (Non-cognitive) Entry Standards**

The OT screening process relies on establishing a good 'fit' between an individual's values, beliefs and attitudes and those of OT, which include, but are not limited to, holistic, ethical and client-centered practice, confidentiality, integrity, respect, human rights, empathy and a non-judgmental persona (Aguilar et al., 2013). This is especially important as it has been suggested that the personal and professional values and ethics that an individual brings with them have a direct link to their personal and professional

behavior in subsequent practice (Aguilar & Stupans, 2012). However, this must be approached with caution as medical research has identified how difficult it is to predict professional performance based on data collected through selection processes (Lucey & Souba, 2010).

### **USA and Canada**

Similar to the cognitive literature, the interest in potential relationship(s) between non-cognitive OT admission and degree outcomes has spanned several decades and produced variable results. This has included high school students' ( $n=31$ ) interview scores correlating significantly with academic performance in the first three years of a four year program; university students' ( $n=15$ ) high admission interview scores outscoring those admitted on high academic qualifications in final fieldwork experiences and demonstrating the most improvement in fieldwork performance over the duration of OT training (Posthuma & Noh, 1990; Posthuma & Sommerfreund, 1985). In 1997, a 36-item survey of all 73 AOTA accredited baccalaureate programs explored the content, purpose and effectiveness of interviews in the admissions process. With a response rate of 68% ( $n=50$ ), results showed that 48% ( $n=24$ ) used interviews as a selection tool and demonstrated that interviews were loosely to moderately structured, minimal interviewer training was provided and the effectiveness of interviews was not examined (Agho et al., 1998). Twenty years later, a survey of 155 AOTA programs offering master's and doctoral level OT education yielded a 20% ( $n=31$ ) response rate with 66.7% ( $n=20$ ) using interviews, comprising of single applicant and panel ( $n=8$ ); multiple applicants and panel ( $n=2$ ); single applicant/single interviewer ( $n=6$ ) or multi-mini interviews (MMIs) ( $n=4$ ; Bowyer et al., 2018), confirming the continued use of interviews despite a continued lack of plausible evidence to support them (Eva et al., 2004; Grice, 2014).

Presented as a viable alternative to traditional one-to-one interviews, MMIs have attracted increasing positive attention in the healthcare literature as they have "consistently shown statistically significant, practically relevant, positive predictive correlations with future performance" (Siu & Reiter, 2009, p. 761). Valued for the ability to allow multiple interviewers to evaluate multiple candidates' non-cognitive capacity through values-based scenarios and reduce interviewer bias, time, labor and costs (Eva et al., 2004), a trial of the MMI with one OT program over two admissions cycles ( $n=106$  applicants) found that 98% found it at least "satisfactory" and no candidates reported it to be a worse experience in comparison to other selection styles they had encountered. Additionally, the OT admissions team considered the MMI preferable to traditional interviews due to its ability to increase objectivity, reduce bias, offer a better picture of candidate character and skills and prevent candidates the opportunity to rehearse (Grice, 2014).

Citing the questionable reliability and validity of structured interviews in selecting successful applicants, 64 OT students were interviewed using a behavioral interview (BI) designed to assess interpersonal skills, ability as a team player, reflective and professional skills using client case scenarios. As with the MMI, feedback from faculty and candidates positively favored the BI process over traditional interviews and while

correlations between the BI score and first semester academic scores were not significant, further investigation of the BI as a tool for selecting successful applicants is indicated (Li et al., 2017).

### **United Kingdom**

Although there is an identified need to assess and record professional values at admission, UK professional, educational and ethical OT standards (College of Occupational Therapists, 2007, 2014a, 2015) do not include a definition of the term(s) professional, professionalism or professionalization, despite including a list of 'key terms', thus leaving the reader to analyze and interpret individual meanings of professional behaviors. An absence of definitive, succinct and accepted definitions is not unique to the UK (Robinson et al., 2012), suggesting that while professionalism is firmly embedded in OT curricula and documentation, there is a lack of explicit discussion, understanding and universal agreement of the terms in Western cultures (Bossers et al., 1999; Aguilar et al., 2013; Hordichuk et al., 2015). Without an agreed definition of professionalism, OT admissions tutors face a dilemma around not only 'what' professional (non-cognitive) skills to assess but 'how' to record them. There is a lack of empirical research in the UK related to non-cognitive entry standards for OT, with international literature suggesting the 'what' includes, interpersonal communication, reflection, critical thinking, problem-solving, valuing autonomy and remaining non-judgmental, commitment and enthusiasm to the profession, organization, self-confidence, sensitivity and adaptability (Edwards et al., 2005; Li et al., 2017; Lyons et al., 2006; Posthuma & Sommerfreund, 1985). The 'how' is dominated by reference to traditional admissions interviews, despite the considered negative issues relating to labor, time and cost-intensity, bias and lack of validity and reliability across the medical and allied health professions literature (Eva et al., 2004; Grice, 2014; Salvatori, 2001).

While assessment of non-cognitive abilities is clearly supported in the literature, just what qualities should be assessed and how remains contested, particularly as there is a lack of valid and reliable non-cognitive measurement tools available, with little evidence to suggest positive relationships between pre-entry non-cognitive assessment outcomes and academic and professional performance at graduation (Salvatori, 2001; Timer & Clauson, 2011).

### **Methods**

This study adopted a cross-sectional research design through quantitative data collection from a single undergraduate OT cohort at distinct points in time, allowing identified quantitative variables to be examined and potential relationships to be uncovered (Bryman, 2016). Using Webb, Campbell, Schwartz, and Sechrest (1966) and Lee (2000) criteria for unobtrusive methods, retrieved archival organizational records relating to data collected at pre-admission (2016) and graduation (2019) by an admissions team for a BSc (Hons) OT program at one UK university were used. The data was considered to be authentic (collated for the purposes of decision-making regarding entry to university); credible (had not knowingly been distorted) and representative (typical of admissions data) (Scott, 1990).



### **Sample**

The sample comprised of an entire cohort of OT students ( $n=44$ ) registered at one UK university in 2016, graduating with a BSc (Hons) OT degree in 2019.

### **Inclusion Criteria**

Variables for inclusion to the study consisted of accumulative pre-admission and graduation data, separated into academic and professional screening assessment scores as detailed in Table 1.

### **Minimum Entry Criteria**

The participating university set a minimum UCAS entry tariff of 320 points across all undergraduate degree programs, including that of OT. In line with the central university's policy, the OT team used pre-entry qualification grades as an assessment of academic (cognitive) skill. Therefore, for the purposes of this study, UCAS tariff points provided a numerical variable from which to measure final degree classifications and percentages against. United Kingdom candidates typically sit a minimum of three, but a maximum of four, A-Level examinations and the numerical conversion to tariff points is explained using A-Level grade results as an example. As minimum entry criteria to the program, OT candidates are required to sit at least one Science A-Level subject (Chemistry, Biology, Physics, Sociology or Psychology) plus two other general A-Level subjects (both science and non-science subjects accepted). The possible UCAS tariff points across the three subjects convert to A-Level subject 1: Grade A (120 points), A-Level subject 2: Grade B (100 points), and A-Level subject 3: Grade B (100 points), totaling the minimum entry criteria of 320 points, with no requirement for the Grade A to be in any particular subject.

Echoing findings of the literature review, the OT team were frustrated by a lack of valid and reliable tools available to assess professional (non-cognitive) skills in OT candidates, and sought to adopt methods to assess values such as creative and flexible thinking. This involved the purchase of the Creativity and Problem Solving Aptitude Test (CAPSAT-R; Psych Tests AIM, 2016) and team-based approach to the development of a non-standardized reflective essay, both of which provided pre-admission numerical variables for comparison with graduation data. The goal of the CAPSAT-R was to establish whether a candidate's attitude and the way in which they approached a problem was conducive to creative thinking. Specifically, could they view things in new ways or from a different perspective, allowing the generation of new possibilities or alternatives? Could they tolerate ambiguity? (Psych Tests AIM, 2016). The reflective essay encouraged candidates to demonstrate their ability to respond creatively to, and interpret the use of, metaphor related to a given poem, case study or piece of artwork. It should be noted however, that these assessments were not chosen as a result of robust evidence but rather anecdotal evidence from the experience of the OT admissions team and author who agreed with the wider OT profession that the skills and qualities required of OT candidates were the ability to solve problems, think flexibly, relate to and interact with others and have respect for individuals' autonomy without being judgmental (Lyons et al., 2006).

Table 1

*Pre-admission and Graduation Data across Academic (Cognitive) and Professional (Non-Cognitive) Inclusion Variables*

<b>Pre-admission Data</b>	
<b>Academic (cognitive) assessment scores</b>	<b>Pre-entry achieved qualifications:</b> A-Level Access to Higher Education (HE) or Business and Technology Education Council (B-TEC)
<b>Professional (non-cognitive) assessment scores</b>  Both assessments were completed by all candidates on the day of selection and under examination conditions (individually but in a room with all candidates and observed by members of the OT admissions team)	<b>CAPSAT-R (Psych Tests AIM, 2016):</b> An online psychometric assessment (up to 20 minutes duration), generating a formal written report according to an overall average numerical score and individual numerical scores in four subsections (comfort with decision-making, flexibility, openness to creativity and sense of self-efficacy) related to limitations, potential strengths and strengths of the candidate.  <b>Reflective essay:</b> An individual hand-written reflection based on a given poem, case study or piece of artwork (up to 60 minutes duration). Double-blind marked by two OT lecturers against marking criteria to produce an overall average numerical score related to the ability to reflect on key issues; construct and explain in writing creative solutions and insights; and consider alternative views or experiences of others. If a discrepancy of $\geq 5\%$ , a third OT lecturer would mark blindly from the initial two markers with an average score of all three scores used for the final result.
<b>Graduation Data</b>	
<b>Academic (cognitive) assessment scores</b>	<b>Final UK degree classifications / percentages awarded in 2019:</b> 1st Class (equating to 70% + or Grade A) 2 <sup>nd</sup> Class (Upper) (equating to 60% - 69% or Grade B) 2 <sup>nd</sup> Class (Lower) (equating 50% - 59% or Grade C) 3 <sup>rd</sup> Class (equating to 40% - 49% or Grade D)

The OT team's recommended minimum admission scores across the cognitive and non-cognitive assessments are listed in Table 2 and constitute the minimum basis for selection of entry onto the OT program. Unlike the university-wide agreed minimum UCAS entry tariff points, minimum scores for the non-cognitive assessments were set internally by the admitting OT team.

Table 2

*Minimum Academic (Cognitive) and Professional (Non-Academic) Assessment Scores Required for Admission into the BSc OT Program*

<b>UCAS Entry Tariff</b>	320 points
<b>CAPSAT-R Average Score</b>	60%
<b>CAPSAT-R Decision Making</b>	50%
<b>CAPSAT-R Flexibility</b>	70% (65% if essay is scored at over 60%)
<b>CAPSAT-R Creativity</b>	70% (65 if essay is scored at over 60%)
<b>CAPSAT-R Self-efficacy</b>	50%
<b>Essay</b>	50% (If essay score is over 65% CAPSAT-R Flexibility and Creativity minimum score is lowered from 70% to 65%)

### **Exclusion Criteria**

Excluded from the original data were three program withdrawals; seven out-of-sync/late graduates; five registrants with a prior first BSc degree and two registrants with a prior Master of Science (MSc) degree that did not fit the UCAS tariff system, leaving a final sample population of ( $n=27$ ).

### **Ethical Considerations**

Maintaining confidentiality in data collection, analysis and presentation of results was a priority throughout the research process. As the data was originally collected for the purposes of decision-making for entry into a BSc (Hons) OT degree program, the author considered the ethical implications of using the information for purposes that applicants were not aware of carefully (Burles & Bally, 2018). Informing candidates of the project would have altered the measurement process and ultimately invalidated the rationale for using an unobtrusive method (Sechrest & Phillips, 1979). In line with ethical consideration, the institutions' Student Services Team anonymized the 2016 BSc (Hons) OT selection day and 2019 final degree results for all registrants before making a copy available to the author. Student numbers were randomized, with individual pre-admission and graduation data inputted into a spreadsheet. Data was cleaned of demographic and identifiable references relating to age at entry, nationality and gender, to reduce the risk of the author deducing the identities of individuals (Dewhurst et al., 2015; Lee, 2000).

### **Data Analysis**

Data analysis was conducted using Statistical Packages for Social Sciences (SPSS, IBM Corp., 2017) software to explore possible correlations between pre-admission data (UCAS tariff points, qualification category [A-Levels, Access to HE or BTEC], selection

day assessment scores [CAPSAT-R scores and reflective essay scores] and graduation data [final degree percentages and classifications]).

The choice of parametric (Pearson correlation coefficient) and non-parametric (Spearman correlation coefficient) correlational tests were guided by the coding of variables as nominal, scale or ordinal (Pallant, 2016). The Pearson correlation test paired scaled, normally distributed pre-admission variables with final degree percentages, while the Spearman correlation test paired ordinal, non-normally distributed pre-admission variables with final degree classifications as highlighted in Table 3. Both tests were used to assess potential correlations of two variables (bivariate), using a two-tailed option so as to establish relationship(s) in either direction, i.e. possible positive or negative correlation(s) between pre-admission and graduation data (Field, 2018). Considering this, the author proffered no hypotheses, preferring to explore and analyze what emerged from the data.

Table 3

*Choice of Parametric and Non-Parametric Tests for Comparison of Pre-Admission and Graduation Variables*

<b>Pre-admission variable</b>	<b>Graduation variable</b>	<b>Test used to assess potential correlations</b>
Reflective essay numerical scores (scale)	Final degree percentages (%) (scale)	Pearson parametric bivariate test (two-tailed)
CAPSAT-R numerical scores (scale)	Final degree % (scale)	Pearson parametric bivariate test (two-tailed)
Qualification category (A-Level; Access to HE; BTEC) (nominal)	Final degree classifications (ordinal)	Spearman non-parametric bivariate test (two-tailed)
UCAS tariff points (scale)	Final degree classifications (ordinal)	Spearman non-parametric bivariate test (two-tailed)
CAPSAT-R ranked order categories (limitation; potential strength; strength) (ordinal)	Final degree classifications (ordinal)	Spearman non-parametric bivariate test (two-tailed)

Tests of normality to check the sample distribution with the normal distribution were completed using Kolmogorov Smirnov<sup>a</sup> and Shapiro-Wilk (Hinton et al., 2014; IBM Corp., 2017). 'UCAS Tariff Points' and 'Qualification Category' were not normally distributed, with a significant finding of  $p < 0.05$  ( $p = 0.00$  and  $0.001$  in both tests). All other variables were of a normal distribution with  $p > 0.05$ .

## Results

Table 2 is recommended as adjunctive reading due to frequent reference and comparison to the program's minimal entry requirements.

### Descriptive Statistics – Entry Qualifications

Table 4 shows the final sample of 27 candidates who entered the program with A-Levels ( $n=13$ ), Access to HE ( $n=13$ ) or B-TEC ( $n=1$ ), reflecting the lack of normal distribution within the qualification category. UCAS tariff points follow a similar pattern of non-normal distribution, ranging between 300 and 420 points; a mean of 376.3; median of 400 and mode of 420.

Table 4

#### *Descriptive Statistics of UCAS Tariff Points at Admission*

<b>Descriptive Statistics for UCAS tariff points</b>	Mean	376.30
	Std. Error of Mean	8.408
	Median	400.00
	Mode	420
	Range	120
	Minimum	300
	Maximum	420

Fifteen students (55.5%) were admitted with 400 UCAS tariff points or more and twelve (44.5%) with 380 or less. Three candidates (11.1%) were admitted with UCAS tariff points below the program's minimum recommended entry criteria of 320 as illustrated in Table 5. It is likely these three candidates were admitted to the program during the UK UCAS Clearing period. This official process allows candidates to apply for and be accepted onto programs with vacancies following release and receipt of their academic qualifications in August, prior to official admission and commencement of undergraduate education in September. Each UK university sets their own lower limit tariff for the period of Clearing and for the host institution in this study, this equated to 300 points or three A-Level subjects at Grade B (100 points each), indicating an accepted reduction in the tariff of 20 points from the typical minimum of 320 points.

Table 5

*Frequency Statistics of UCAS Tariff Points at Admission*

UCAS Points	Frequency	Percentage %
300	3	11.1
320	3	11.1
340	2	7.4
360	3	11.1
380	1	3.7
400	7	25.9
420	8	29.6
Total	27	100.0

**Descriptive Statistics – Reflective Essay**

Results for the reflective essay can be seen in Table 6, which demonstrates a range of 24 (out of 100), as a percentage grade from 50% to 74% with an overall mean of 59.7%, median of 59% and an approximate mode of 50% due to the presence of multiple modes.

Table 6

*Descriptive Statistics of Reflective Essay Numerical Scores*

<b>Descriptive statistics for reflective essay numerical scores</b>	Mean	59.7
	Median	59
	Mode	50 <sup>a</sup>
	Std. Deviation	7.0
	Range	24
	Minimum	50
	Maximum	74
	a. Multiple modes exist. The smallest value is shown	

Further examination of the data illustrates the analysis of essay scores achieved to be between 50% - 59% ( $n=4$ ); 60 – 69% ( $n= 10$ ); 70 - 74% ( $n=3$ ). No candidate selected for admission scored below 50% for the reflective essay, which is coherent with the program's recommendations.

**Descriptive Statistics - CAPSAT-R Categories**

CAPSAT-R (Psych Tests AIM, 2016) scores for each subsection (comfort with decision-making, flexibility, openness to creativity and sense of self-efficacy) were analyzed as both scale (numerical) and ordinal (categorized in ranked order from limitation, potential strength and strength) data. Table 7 illustrates how the overall average of the CAPSAT-R (Psych Tests AIM, 2016) was 72.5%, with the average for sub-categories flexibility

and creativity (both 75.7%) being notably higher than decision-making (65.7%) and self-efficacy (72.7%). Conversely, the range of scores and standard deviations (SD) were lower for flexibility (range 27; SD 6.7) and creativity (range 27; SD 5.4) subsections, when compared to those of decision-making (range 42; SD 11.2) and self-efficacy (range 42; SD 11.1).

Table 7

*CAPSAT-R Numerical Scores (Average and Sub-Categorical Scale Data)*

	CAPSAT- R average numerical score	CAPSAT-R decision-making numerical score	CAPSAT-R flexibility numerical score	CAPSAT-R creativity numerical score	CAPSAT-R efficacy numerical score
Mean	72.5	65.7	75.7	75.7	72.7
Median	73	68	77	75	72
Mode	75	68 <sup>a</sup>	68 <sup>a</sup>	75	72
Std. Deviation	6.0	11.2	6.7	5.4	11.1
Range	29	42	27	27	42
Minimum	61	47	63	62	50
Maximum	90	89	90	89	92

a. Multiple modes exist. The smallest value is shown

Figure 1 illustrates how the ranked CAPSAT-R data detected ‘potential strengths’ and ‘strengths’ in all 4 subsections for all 27 candidates, with ‘limitations’ present only in the self-efficacy and decision-making subsections.

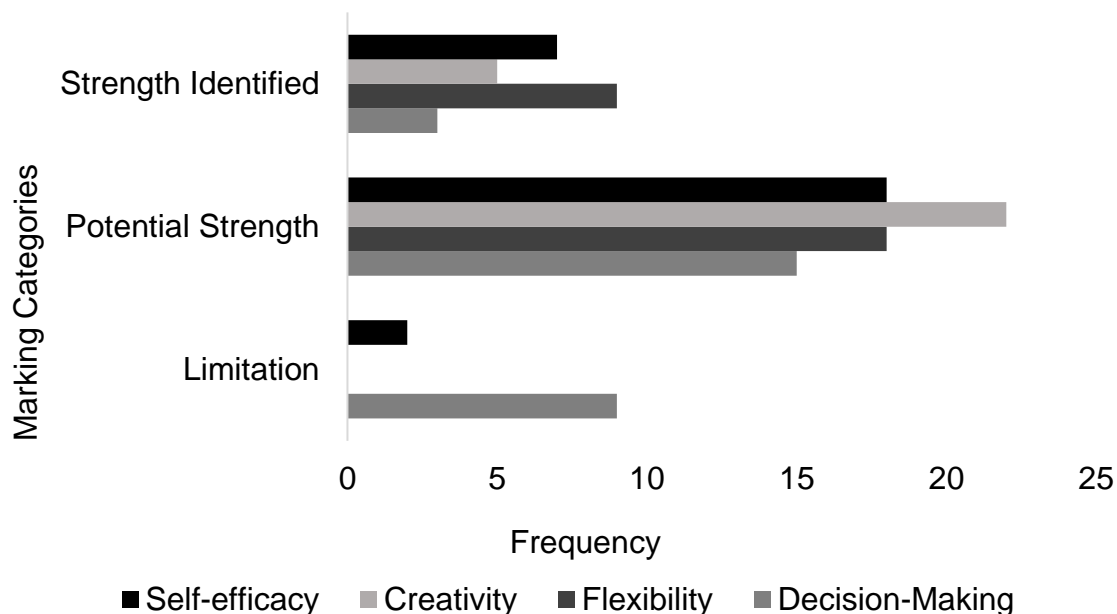


Figure 1. CAPSAT-R categories sum rankings for a cohort of undergraduate OT students (n = 27)

These combined ordinal and ranked statistics are supportive of the program's minimum entry criteria, which recommends rejection of a candidate if they score less than 70% in the areas of flexibility and creativity (or less than 65% if essay score is 60% or over). A decision was made by the admitting team that greater value should be placed on skills related to the sub-sections of flexibility and creativity as there was general professional agreement these skills were considered innate to the individual, whereas the sub-sections of decision-making and self-efficacy skills were more likely to develop over time, alongside the teaching and learning experiences offered by the three year OT program. Analysis of these data sets suggest that there were nine reported frequencies across six individuals scoring below 65% (flexibility  $n=2$ ; creativity  $n=1$ ) and between 65% and 69% (flexibility  $n=4$ ; creativity  $n=2$ ), all of which were admitted to the program and went on to graduate. As the minimum scores for the non-cognitive assessments were set internally (as opposed to centrally by the university), the OT team were able to exercise flexibility over acceptance to the program, which was likely based on a holistic view of the candidate's overall application (UCAS personal statement, academic reference and general presentation on the selection day).

### Inferential Statistics – Local and National Statistics

A review of national OT graduate data (College of Occupational Therapists, 2014b) allows some comparison with the local sample. The three program withdrawals account for a 7% attrition rate (of the original sample of 44), which compares to the UK-wide average of 8%. As can be seen in Table 8, UK degree classifications awarded at both a local and national level show a general trend in terms of distribution with the highest percentage awarded at 2<sup>nd</sup> Class (upper, equivalent to Grade B) (59% local; 42% national), followed by 1<sup>st</sup> Class, equivalent to Grade A (22% local; 30% national), 2<sup>nd</sup> Class (lower, equivalent to Grade C) (15% local; 24% national) and 3<sup>rd</sup> Class, equivalent to Grade D (4% at both local and national).

Table 8

*Final OT Degree Classifications Awarded Locally (2019) and Nationally (2015) for UK Undergraduate OT Students*

	1 <sup>st</sup> Class (70%+ or Grade A)		2 <sup>nd</sup> Class (upper) (60% - 69% or Grade B)		2 <sup>nd</sup> Class (lower) (50% - 59% or Grade C)		3 <sup>rd</sup> Class (40% – 49% or Grade D)		Totals	
	Number	%	Number	%	Number	%	Number	%	Number	%
<b>Local (2019)</b>	6	22	16	59	4	15	1	4	27	100
<b>National (2015)</b>	407	30	568	42	315	24	51	4	1341	100



### Relationship Statistics – Non-Parametric Tests of Pre-Entry Qualifications and Final Degree / Percentages Classifications

Spearman correlational coefficient showed that there was no significant relationship between pre-admission qualifications (UCAS tariff points) and graduation results (degree percentages), with  $r = -.275$ ;  $p = 0.16$ ). Similarly, no significant relationships were found between entry-level qualification type and final degree classifications. Table 9 shows the highest frequency of award (2<sup>nd</sup> class (upper);  $n = 16$ ; 59%) is evenly represented between candidates that entered with A-Levels ( $n = 8$ ) and Access to HE ( $n = 8$ ).

Table 9

#### *Pre-entry Qualifications and Degree Classifications Awarded*

	A-Level	Access to HE	BTEC	Total Awards (%)
<b>1<sup>st</sup> Class</b>	4	2	0	6 (22%)
<b>2<sup>nd</sup> Class (Upper)</b>	8	8	0	16 (59%)
<b>2<sup>nd</sup> Class (Lower)</b>	1	2	1	4 (15%)
<b>3<sup>rd</sup> Class</b>	0	1	0	1 (4%)
<b>Total Awards</b>	13	13	1	27 (100%)

### Relationship Statistics – Parametric Tests of Reflective Essay Scores; CAPSAT-R Numerical Scores and Final Degree Percentages

The Pearson correlation coefficient test found no statistically significant relationship ( $p = 0.97$ ) between reflective essay scores and final degree percentages ( $r = .007$ ).

Additionally, no statistically significant relationships between CAPSAT-R (Psych Tests AIM, 2016) scores (overall and each subsection) and final degree percentages were identified as identified in Table 10.

Table 10

*Pearson's Correlation Coefficient Test of CAPSAT-R Scores and Final Degree Classifications*

		Final degree percentage %
<b>CAPSAT-R average numerical score</b>	Pearson Correlation	.09
	Sig. (2-tailed)	.62
<b>CAPSAT-R decision-making numerical score</b>	Pearson Correlation	.20
	Sig. (2-tailed)	.30
<b>CAPSAT-R flexibility numerical score</b>	Pearson Correlation	-.05
	Sig. (2-tailed)	.80
<b>CAPSAT-R creativity numerical scores</b>	Pearson Correlation	-.10
	Sig. (2-tailed)	.59
<b>CAPSAT-R efficacy numerical scores</b>	Pearson Correlation	.08
	Sig. (2-tailed)	.66

**Discussion****Pre-admission Academic (Cognitive) Data and Final Degree Classifications**

While no predictive relationships between UCAS tariff points and final degree classifications were found in this study, further exploration of those students considered 'outliers' at either end of the tariff spectrum were explored.

1. **Candidates not meeting the minimum UCAS tariff of 320 points.** Three candidates entered the program with a tariff of 300 points but met the minimum requirements of the non-cognitive criteria for the reflective essay and CAPSAT-R (Psych Tests AIM, 2016) assessment.
2. **Candidates entering with UCAS tariff of 400 points or more.** Fifteen candidates entered the program with a tariff of 400 points or more (seven with 400; eight with 420) and met all other minimum requirements for non-cognitive assessments. The exception being one candidate who scored 58% for the reflective essay and is subsequently discussed in detail in the 'pre-admission personal and professional (non-cognitive) data and final degree classifications' section.

With these details plotted into a bar chart in Figure 2, it is clear to see how the UCAS tariff for these candidates cannot be taken as a predictor of degree success. The three candidates with 300 points achieved 1<sup>st</sup> Class ( $n = 1$ ) and 2<sup>nd</sup> Class (upper) ( $n = 2$ ) degrees. Conversely, just one of the eight students with 420 points earned a 1<sup>st</sup> Class, with two of the seven candidates with 400 points achieving at this level (two of the three

candidates scoring 320 points earned 1<sup>st</sup> Class degrees). While the largest percentage of 2<sup>nd</sup> Class (upper) degrees were awarded to those with 420 points ( $n = 5$ ; 18.5%), the only 3<sup>rd</sup> Class degree awarded was to a candidate with a tariff of 400 points.

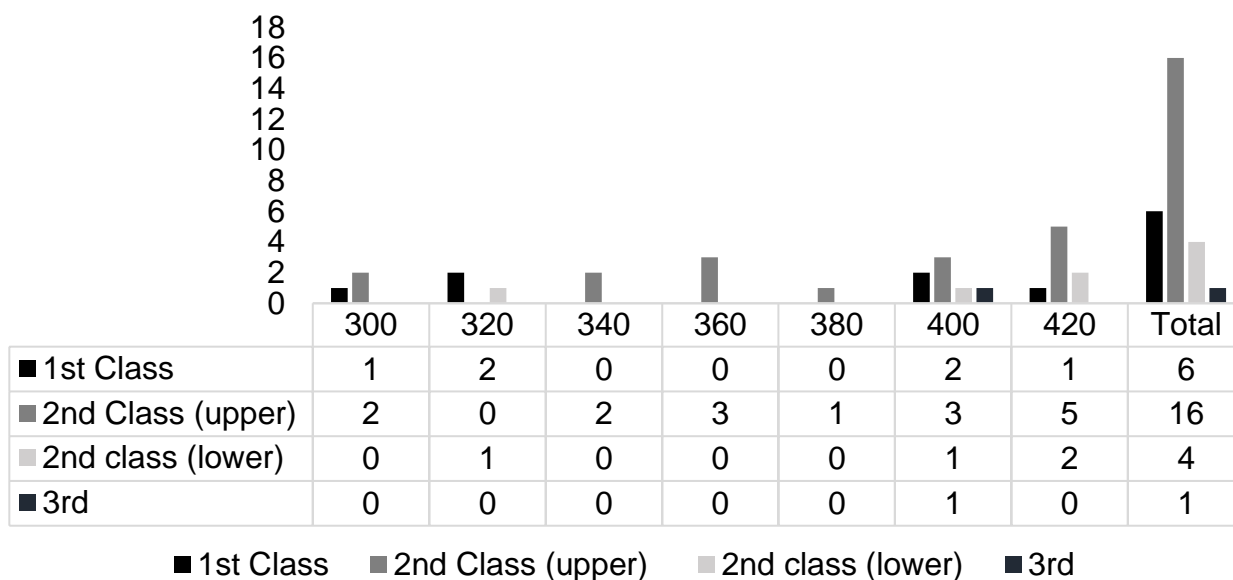


Figure 2. UCAS tariff points and final degree classifications awarded to a cohort of undergraduate OT students ( $n = 27$ ).

The results of this study support the OT specific research before it that found no significant correlations between pre-admission qualifications and final degree outcomes for undergraduate OT students (Howard & Jerosch-Herold, 2000; Howard & Watson, 1998; Posthuma & Noh, 1990; Tyldesley, 1986). It is worth noting however, that the cumulative evidence from these studies relates to students enrolled onto baccalaureate degrees. When the evidence is considered for those students entering OT training with a first degree, the correlation between pre-admission qualifications and graduate success is far more positive (Bowyer et al., 2018; Katz & Mosey, 1980; Kirchner & Holm, 1997; Kirchner et al., 2001; Lysaght et al., 2009; Shanahan, 2004). Seven students with a previous degree ( $n=5$  BSc and  $n=2$  MSc) were excluded from this study. Inclusion of these candidates may have offered opportunity to extend previous research that found students over 21 years with a previous degree, do better academically than their peers (Shanahan, 2004).

### Pre-admission Professional (Non-Cognitive) Data and Final Degree Classifications

As with the cognitive data, exploration of those candidates who might have been rejected due to scores below the program's accepted minimum in the CAPSAT-R (Psych Tests AIM, 2016) categories of flexibility and creativity, and reflective essay received closer inspection. Of the six candidates that scored below the minimum standard, two were weaker in both the reflective essay (60% and 58%) and the psychometric assessment for flexibility (64% and 68%), graduating with a 2<sup>nd</sup> Class (upper) and 2<sup>nd</sup> Class (lower) respectively. Two of the four remaining candidates both

scored 68% in flexibility and both received a 2<sup>nd</sup> Class (upper). The remaining two candidates scored 68% and 63% for flexibility and 62% and 69% for creativity but achieved a 2<sup>nd</sup> Class (upper) and 1<sup>st</sup> Class award respectively. Having found no significant links between reflective essay and psychometric scores and graduation data for the sample population, results of this study support the argument that assessments such as essays [personal statements and interviews] are not significant predictors of final degree outcomes (Timer & Clauson, 2011).

Across cognitive and non-cognitive assessment scores, this study has highlighted nine candidates who did not meet the minimum standards considered acceptable for admission. Despite this, all nine were admitted and subsequently graduated. Had this not happened, the university and the profession of OT could have potentially lost nine graduates who achieved a 1<sup>st</sup> Class ( $n=2$ ), 2<sup>nd</sup> Class (upper) ( $n=6$ ) and 2<sup>nd</sup> Class (lower) ( $n=1$ ) degree classification.

### Limitations

The limitations of this small-scale pilot include potential issues related to data collection at selection and admission to the program. As data was entered by others it could have led to data-entry error, selective recording, or unreliability (Lee, 2000). Equally, due to the unobtrusive nature of the research, all data was cleaned of demographics including age, gender, residential information, pre-admission qualification school/ college, previous work experience/ employment history and nationality. All variables may have been useful in terms of exploring potential relationships between admission data and final degree results, while also offering interesting comparisons among the sample. For example, school leavers versus mature students aged 21+; male versus female; residential areas and school(s)/ college(s) considered to have low participation rates of university graduates versus higher rated areas; UK versus international students.

Data analysis was limited to quantitative methods of a statistical nature. In addition to the admissions criteria stipulated within this article, all candidates engage with an OT (clinician, lecturer and/ or researcher) in a semi-structured interview. Questions relate to why candidates have chosen OT over another healthcare profession, their understanding of the broad role and scope of OT, the values they perceive as essential to the role of OT, examples of observing such values in practice and how they can evidence their alignment with the stated values. Exploration of this data may have offered the opportunity to uncover qualitative thematic analysis and support the quantitative data in relation to the skills, qualities and/ or values required of OT graduates. If themes were uncovered, it would have been informative to seek possible relationships with final degree results and ascertain if or how results from the semi-structured interview influenced decisions related to acceptance or rejection from the program.

This study has focused on the academic (cognitive) success of OT students at graduation. However, the profession requires graduates who can perform both academically and professionally in practice, education and research. It would therefore have been interesting to explore if correlation(s) exist between pre-admission

assessment scores and the cohort's fieldwork performance (4 fieldwork experiences over a three year period, totaling 1,000 hours) to examine both the academic and professional outcomes of the program.

As a result of the small sample size (reduced from 44 to 27 due to the exclusion criteria applied) from one university in the UK, the results of this study cannot be considered generalizable to a wider sample of undergraduate OT students in the UK or internationally. Similarly, it was not possible to compare this study's pre-entry qualification tariff and final degree results with national figures from the 35 UK Universities that offer BSc and MSc OT programs.

Perhaps the most significant limitation of this study relates to the internal decisions made by the OT admissions team regarding the minimum entry criteria for academic (cognitive) and professional (non-cognitive) skills assessed at selection to the specified OT program. In the absence of standardized criteria within and across education providers, the selection of assessments and their associated minimum scores were based on the shared experience and tacit knowledge of the admitting team. This combined expertise led to the admission and graduation of nine candidates who ordinarily may have been rejected from the program. This raises the question that if as OT admissions tutors, we do not have access to robust assessment measures based on best practice, how can we be certain we are not missing opportunities to attract and recruit the best candidates who will possess the core skills and values required to graduate as occupational therapists and contribute to the development and progression of the OT profession across clinical, educational and research contexts?

As the author is a member of the RCOT Admissions Tutors forum (open to OT tutors with responsibility for admissions at all UK Universities), some of these limitations may be addressed in future research, ethical application and approval pending.

### **Implications for Occupational Therapy Education**

Occupational therapy programs have an ethical duty to ensure they make appropriate and accurate decisions, selecting the best students who will be successful academically and professionally, progressing to graduation and contributing to the development and continuation of the OT profession (Eva et al., 2004; Li et al., 2017). This paper has explored the evidence around what assessments, measurement and recording tools are considered effective in predicting graduation success for OT students, while presenting specific data from one cohort of UK OT students. A review of the literature demonstrated a general consensus that both cognitive and non-cognitive qualities and skills of those entering the healthcare professions, including OT, should be assessed at selection (Salvatori, 2001). Evidence to support pre-academic qualifications as a cognitive assessment of graduation success is stronger for those students entering OT training with a previous degree (Bowyer et al., 2018; Katz & Mosey, 1980; Kirchner & Holm, 1997; Kirchner et al., 2001; Lysaght et al., 2009; Shanahan, 2004) as opposed to those from a high-school background (Howard & Jerosch-Herold, 2000; Howard & Watson, 1998; Posthuma & Noh, 1990; Posthuma & Sommerfreund, 1985), with results from this study adding further evidence in support of this.

The complex debate around what, and how, non-cognitive skills should be assessed at selection continues. Assessments of emotional intelligence, communication, and self-confidence lack validity and reliability, with evidence suggesting they do not correlate with graduate success in the same way that academic assessments do (Newsome et al., 2000; Posthuma & Sommerfreund, 1985; Salvatori, 2001; Timer & Clauson, 2011). Despite a lack of evidence to support traditional interviews, they have historically been used as a tool to determine entry into OT education (Agho et al., 1998; Bowyer et al., 2018; Grice, 2014; Posthuma & Noh, 1990; Posthuma & Sommerfreund, 1985). More recently, there has been an emergence of alternatives to the traditional interview such as the MMI and BI, both of which have produced links between admission and graduation outcomes (Grice, 2014; Li et al., 2017). Having found no correlation between non-cognitive assessment scores, which measure professional skills the results of this study add weight to the call for OT admissions tutors to consider MMIs and BIs as a potentially effective part of admissions criteria (Bowyer et al., 2018).

### **Conclusion**

This paper has explored the relationships between pre-entry academic (cognitive), professional (non-cognitive) skills, and graduation results in OT students. While no relationships were found among this small sample population, an unexpected finding of this study was the data related to the nine candidates who did not meet the minimum cognitive and/ or non-cognitive admissions criteria for the program but whom were admitted. All nine candidates went on to graduate with a range of degree classifications. Had these candidates not been admitted at selection, this would have resulted in the potential loss of nine graduates to the university and the OT profession in general. Equally, not all students who entered the program having exceeded academic and non-academic expectation progressed with the same impressive results at the point of graduation.

This study has demonstrated how pre-entry data is not necessarily a predictor of final degree attainment, thus indicating the need for further research. This includes consideration of what other variables (i.e. psychological well-being; motivation; teaching and learning opportunities) may have an impact upon a student's journey and degree classification (Dewhurst et al., 2015) and how such variables might be measured at the point of OT education selection, duration and completion. There is also a requirement for research to explore the identified areas of uncertainty related to the robust assessment and recording of academic and professional skills at selection and to develop a streamlined, evidence-based framework upon which to base recruitment decisions. The aim being to increase confidence in the selection and admission process across the broad landscape of educational OT provision.

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