

Predictors of academic integrity in undergraduate and graduate-entry masters occupational therapy students

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Abstract

Background: Academic integrity is viewed as honest and responsible scholarship and the moral code of academia. Reported incidences of academic dishonesty among health professional students are widespread and may be an indicator of future unprofessional behaviour in the workplace. **Aim:** This study investigated the potential predictors of academic integrity in undergraduate and graduate-entry masters occupational therapy students. **Method:** Occupational therapy students from five universities ($n = 701$ participants; 609 undergraduates; 92 graduate-entry masters) were recruited. Data were collected via a two-part self-report questionnaire that included six standardised scales: *Academic Dishonesty Scale*; *Academic Dishonesty in the Classroom Setting Scale*; *Academic Dishonesty in the Clinical/Practice Education Setting Scale*; *Moral Development Scale for Professionals*; *Academic Dishonesty Tendency Scale*; and *Perceived Academic Sources of Stress*. Data analysis involved multi-linear regression analyses with bootstrapping. **Result:** Significant predictors of academic integrity in occupational therapy students included age, gender, grade point average, public meaning, moral practice, general tendency towards cheating, tendency towards dishonesty in the conduct and reporting of research findings, tendency towards not providing appropriate references and acknowledgements and pressures to perform well academically. **Conclusion:** These findings will assist educators in identifying vulnerable students potentially prone to academic integrity infringements and implementing proactive strategies with them. Further studies are recommended to explore further predictors of students' academic integrity.

Keywords

Academic integrity, occupational therapy, students, undergraduate, graduate-entry masters

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Introduction

Academic integrity is the moral code of academia whereby students and staff generate and disseminate knowledge in an ethical and honest manner and apply behaviours that promote the teaching and acquisition of skills, new learning and values in fair and responsible ways. The accurate reporting of research findings, citing of all sources of information, expressing original ideas in assignments, completing assessment tasks independently, not acknowledging collaboration when it occurs and displaying trustworthiness during examinations are all examples of breaches of academic integrity. Behaviours that contravene the ethos of academic integrity are practices where students seek to gain an unfair advantage for themselves (Krueger,

2014). In classroom and fieldwork settings, this may include unauthorised collaboration on assessable written, oral or practical work, providing test questions to other students on completion of an examination,

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submitting assignments completed by a third party and not the student themselves, using technology to access test banks, plagiarism, falsifying test results and recording assessments that were not carried out (Balik et al., 2010; Klocko, 2014).

The prevalence of dishonest behaviours in higher education has been widely reported, with research spanning cohorts of students from a variety of disciplines including business, education and the health sciences (Okoroafor et al., 2016; Tsui & Ngo, 2016; Yeşilyurt, 2014). The evidence suggests that institutions struggle with students' poor levels of academic integrity, the apparent lack of knowledge about how to apply the conventions of academic integrity and the importance of doing so (Bretag et al., 2014). Compounding the issue is research indicating that many students do not view their actions as out of the ordinary or morally wrong when in fact they contravene academic integrity principles (Josien & Broderick, 2013). This has serious implications for students graduating in the health sciences since there is evidence that dishonest practices engaged in by students in the academic or practice education settings can be carried forward into the professional arena where new graduates are employed (Krueger, 2014).

Research within occupational therapy and beyond has investigated a wide range of potential factors that determine the extent of students' engagement in honest academic behaviours including approaches to learning, behavioural profiles, beliefs about the acquisition of knowledge, admission criteria, test anxiety and competition among peers (Bonsaksen, 2016; Bonsaksen et al., 2017; Howard & Jerosch-Herold, 2000; Mitchell, 2015; Shanahan, 2004; Yeşilyurt, 2014). The impact of other factors have also been reported (such as the fear of failure, web-based study frameworks, the ubiquitous use of social media among students, peer competition, low levels of satisfaction with the teaching and learning environment, ignorance of academic integrity policies, ease of cheating on assessments, cost-cutting and credentialism in higher education (Bretag & Harper, 2017; Ip et al., 2016; Korn & Davidovitch, 2016; Oran et al., 2016). A common feature of many studies, however, is that breaches are often committed unintentionally and result from gaps in students' knowledge about what constitutes academic integrity.

It is therefore important to establish the factors that predict academic integrity in occupational therapy students. This will assist educators in identifying vulnerable students who may exhibit tendencies towards engaging in dishonest behaviours. This study builds on the existing body of evidence that investigated the predictors of academic outcomes in occupational therapy students (Bonsaksen, 2016; Shanahan, 2004; Watson, 2013). Establishing a range of factors that

may predict students' academic integrity will facilitate a commitment to informed curriculum planning, design and implementation. Remedial strategies and programmes that bridge gaps in students' knowledge will better enable educators and institutions to actively promote academic integrity as a core competence for all occupational therapy students.

The aim of this study was to investigate what the potential predictors of academic integrity were in a sample of Australian undergraduate (UG) and graduate-entry masters (GEM) occupational therapy students. The research question posed was: what independent factors predicted overall, classroom and field-work academic integrity in UG and GEM occupational therapy students?

Methods

Participants

UG and GEMs occupational therapy students enrolled at Monash University, Australian Catholic University, La Trobe University, University of Canberra and the University of Queensland were recruited using a convenience sampling method. In total, 701 participants were recruited consisting of 609 (86.9%) UG and 92 (13.1%) GEMs students. UG programmes are typically four years in length and the graduate-entry professional master's programme is an accelerated two-year course undertaken by students with a related degree.

Instrumentation

Students completed either an online or paper-based self-report questionnaire comprising two sections to elicit information about their academic integrity and performance. The first section contained demographic questions where students were asked to report their year level of enrolment, gender, age, student status (domestic or international; full-time or part-time), academic grade point average (GPA) and number of hours per week spent in direct and indirect study, and paid work. For the GPA question, students were asked to report the percentage range of their scholastic average out of 100 (e.g. < 49%, 50–59%, 60–69%, 70–79%, 80–89%, > 90%). The second section consisted of five standardised scales that used a Likert scoring system to measure students' general academic integrity, tendencies to engage in dishonest behaviours, moral development and perceived sources of academic stress.

The *Academic Dishonesty Scale* (McCabe & Trevino, 1997) was used to generate a total academic dishonesty cheat score, a measure of students' general academic integrity. Respondents were asked to rate 14 academic behaviours using a five-point Likert-type

scale (Completely Dishonest = 1; Dishonest = 2; Neither Dishonest or Honest = 3; Honest = 4; Completely Honest). Example items included 'copying from another student during a test' and 'using material from a published source in a paper without giving the author credit'. The scale has reported reliability and validity with evidence of good internal consistency (Cronbach's alpha coefficient of 0.83) (McCabe & Trevino, 1997; McCabe et al., 2001).

The *Academic Dishonesty in the Classroom Setting* (ADCS) and *Academic Dishonesty in the Clinical/ Practice Education Setting* scales (ADCPES) (Krueger, 2014) investigated academic behaviours that students may or may not engage in the classroom and field settings. Respondents rated 20 (ADCS) and nine (ADCPES) behaviours respectively in relation to the frequency they have engaged in it using a five-point Likert-type frequency scale (Never = 1; Seldom = 2; Sometimes = 3; Often = 4; Very Often = 5) and how seriously they regard the behaviour also using a five-point Likert-type scale (Not Serious = 1; Slightly Serious = 2; Moderately Serious = 3; Serious = 4; Very Serious = 5). Example items included 'Working with another student on an out-of-class assignment when it should be an individual task', 'Reporting assessment results that were not completed' and 'Getting test questions from another student who has taken the examination at an earlier time'. Responses generated total, seriousness and frequency mean scores. The instruments have reported reliability and validity (Krueger, 2014).

The *Moral Development Scale for Professionals* (MDSP) (Skisland et al., 2012) measured students' moral development in professions where decision-making has ethical implications and there is a high level of responsibility for other people. The MDSP consisted of 12 statements which load on to four subscales: authoritative standards; public meaning; moral practice; common values. The 12 MDSP items were scored using a five-point Likert-type level of agreement rating scale (Disagree completely = 1; Disagree = 2; Neither disagree nor agree = 3; Agree = 4; Agree completely = 5). Example items included 'A good value is valid for all people' and 'It is usually possible to reach consensus in moral issues'. Evidence of the validity of the MDSP was established through exploratory factor analysis and internal consistency was reported with a Cronbach's alpha coefficient of 0.67 (Skisland et al., 2012).

The *Academic Dishonesty Tendency Scale* (ADTC) (Eminoglu & Nartgun, 2009) examined university students' tendencies to engage in academically dishonest behaviours. Responses loaded onto four subscales: tendency towards cheating; tendency towards dishonesty in assignments, essays and studies; tendency towards

dishonesty in the process of doing and reporting research; tendency towards dishonesty in providing appropriate references and acknowledgements. Examples of the 22 items included 'It is plagiarism to use others' authentic ideas and thoughts without providing appropriate references' and 'It is harmless to ask for the help of other students during exams'. Subscale scores of 1.00–1.79 equated to very low tendency to engage in academic dishonesty while scores of 4.20–5.00 represented a very high tendency. The 22 ADTC items were scored using a five-point Likert-type level of agreement rating scale (Disagree completely = 1; Disagree = 2; Indecisive = 3; Agree = 4; Agree completely = 5). The scale has proven reliability and construct validity with Cronbach's alpha coefficients ranging from 0.71 to 0.90 (Eminoglu & Nartgun, 2009).

Bedewy and Gabriel's (2015) *Perceived Academic Sources of Stress* (PASS) scale measured levels of academic stress in university students and responses to the 18 statements loaded onto four subscales: pressures to perform; workload and examinations; self-perceptions; time restraints. PASS items are answered by respondents using a five-point Likert-type level of agreement rating scale (Strongly Disagree = 1; Disagree = 2; Neither disagree nor agree = 3; Agree = 4; Strongly Agree = 5). Item examples included 'I fear failing courses this year' and 'The unrealistic expectations of my parents stress me out'. Validity of the instrument has been established and reliability information reported with reported Cronbach's alpha coefficients for the subscales ranging from 0.50 to 0.60 (Bedewy & Gabriel, 2015).

Data analysis

The Statistical Package for the Social Sciences, version 22 (IBM Corporation, 2013), was used for data entry, storage and analysis. Results were analysed using multi-linear regression to determine if any significant predictors of general, classroom and fieldwork academic integrity in occupational therapy students existed. A resampling technique, *bootstrapping*, a type of robust statistic that infers a population from sample data, was therefore used (Chernick, 2007). By taking, with replacement, the values from the original sample to obtain 2000 UG and 1000 GEM bootstrapped samples, the accuracy of the confidence interval estimation can be improved. For analyses, $p < 0.05$ was considered statistically significant.

Procedures

Ethics committee approval for this project was obtained from the participating universities. Students were asked to complete the self-report questionnaire at

the end of a lecture by a non-teaching member of staff either in hard copy or online. Students were also sent an email informing them about the details of the study and that they could complete it online if they wished to take part in the study. Students were informed that participation was voluntary, and consent was inferred by students completing and submitting the questionnaire. The anonymity of participants was guaranteed since there was no identifiable information on the questionnaires and data were analysed on a group basis. Data collection with first-year UG and GEMs students took place in the second semester of their course to ensure that they had adequate exposure to completing assessment tasks and assignments. The self-report questionnaire took respondents approximately 25 min to complete based on fielding testing findings.

Results

Demographic results

The majority of the sample fell into the categories of being female, domestic students aged 20–29 years with an even spread of year levels among UGs (see Table 1). GEMs students spent more hours per week engaged in direct and independent study and paid work than UGs.

Instrument scores

UGs and GEMs recorded similar scores across measures of general academic dishonesty and reported rates of frequency and seriousness of dishonest behaviours within classroom and fieldwork settings (see Table 2). UGs scored higher on measures of tendencies towards cheating, dishonesty in assignments and providing appropriate references and acknowledgements, while GEMs recorded a higher score on the tendency to dishonesty in research subscale. UGs recorded higher scores on three of the moral development subscales: authoritative standards, moral practice and common values. GEMs performed better on the public meaning subscale. On the perceived stresses scale, the scores indicated that GEMs experienced slightly less stress than UGs on three factors: pressures to perform; perception of workload; time restraints (see Table 2). However, there was a notable difference in scores on the self-perceptions subscale.

Regression analysis

Regression analysis was completed focussing on three dependent variables: academic integrity; academic integrity in classroom settings; and academic integrity in fieldwork settings. The analysis revealed a range of statistically significant factors that were predictive of

UG and GEM occupational therapy student academic integrity.

Predictors of general academic integrity. UG: Eleven independent variables were included in the regression equation that accounted for 12.40% of total variance of the dependent variable ($R^2 = .124$, $F(11, 597) = 7.67$, $p = .001$) (see Table 3). Eight independent variables made a unique contribution to the overall variance of the dependent variable (see Table 3).

GEM: The regression equation included seven independent variables and accounted for 26.8% of total variance of the dependent variable ($R^2 = .268$, $F(7, 84) = 4.39$, $p = .001$). Two independent variables made a unique contribution to the regression results (8.76%; $p = .006$) (see Table 3).

Predictors of academic integrity in classroom settings. UG: Fifteen independent variables were included in the regression equation. The results accounted for 14.7% of total variance of the dependent variable ($R^2 = .147$, $F(15, 593) = 6.81$, $p = .001$) (see Table 4).

GEM: The GEM regression equation included six independent variables. The results accounted for 12.8% of total variance of the dependent variable ($R^2 = .128$, $F(6, 85) = 2.08$, $p = .064$). The regression results were not statistically significant (see Table 4).

Predictors of academic integrity in fieldwork settings. UG: The regression equation included eight independent variables. The results accounted for 7.4% of total variance of the dependent variable ($R^2 = .074$, $F(8, 600) = 6.00$, $p = .001$) (see Table 5).

GEM: Five independent variables were included in the regression analysis and accounted for 16.4% of total variance of the dependent variable ($R^2 = .164$, $F(5, 86) = 3.38$, $p = .008$) (see Table 5).

Discussion

This study investigated factors that were potential predictors of academic integrity in UG and GEM occupational therapy students. Regression analysis revealed a range of statistically significant predictors of general, classroom and fieldwork academic integrity. A greater number of predictors were identified for UGs compared to GEM students.

Predictors of general academic integrity

At UG and GEM level, gender was shown to be predictive of general academic integrity of both UG and GEM occupational therapy students. Gender accounted for 1.32% and 6.8% ($p < .001$) of the unique variance of general academic integrity for UG

Table 1. Demographic data, self-reported GPA and time spent in direct education, indirect study and paid work (UG: $n = 609$; GEM: $n = 92$).

Year of enrolment (UG)	Frequency	Percentage		
First year	172	28.2		
Second year	164	26.9		
Third year	167	27.4		
Fourth year	106	17.4		
Year of enrolment (GEM)				
First year	47	51.1		
Second year	45	48.9		
	UG		GEM	
Age range				
17–19 years	172	28.2	1	1.1
20–24 years	364	59.8	34	37.0
25–29 years	36	5.9	35	38.0
30–34 years	13	2.1	11	12.0
35–39 years	8	1.3	2	2.2
40 years or older	16	2.6	9	9.8
Gender				
Male	167	27.4	26	28.3
Female	442	72.6	66	71.7
Enrolment category				
International student	83	13.6	15	16.3
Domestic student	526	86.4	77	83.7
	UG		GEM	
	Mean	SD	Mean	SD
GPA				
<49%	7	± 1.1	4	± 4.3
50–59%	40	± 6.6	14	± 15.2
60–69%	211	± 34.6	44	± 47.8
70–79%	226	± 37.1	27	± 29.3
80–89%	110	± 18.1	3	± 3.3
>90%	15	± 2.5	4	± 4.3
Hours/week in face-to-face education	14.75	± 5.258	14.93	± 7.953
Hours/week dedicated to independent study	15.11	± 9.139	19.49	± 11.294
Hours/week of paid work	10.21	± 8.185	10.87	± 9.488

GPA: grade point average; UG: undergraduate; GEM: graduate-entry masters; SD: standard deviation.

and GEM students respectively. The association between gender and the application of honest academic behaviours among university students is consistent with previous research (Richardson et al., 2012). Studies of occupational therapy and nursing UGs demonstrate that female gender is a reliable predictor of better academic outcome and male gender is associated with poorer academic performance, and higher incidences of academic dishonesty (Korn & Davidovitch, 2016; Watson, 2013). It is encouraging that the self-reported rates of dishonest academic behaviours within the current study are low compared to previous research involving other samples of health science students (Okoroafor et al., 2016).

In this study, GPA was shown to be predictive of UGs' academic integrity ($p = .015$). However, as one

might reasonably expect high-achieving students to demonstrate academic rigor in their work. This finding was therefore not unexpected. It is suggested that GPA cannot be studied in isolation, but should always be considered in tandem with other variables such as age, gender and year level of university enrolment (Brown & Murdolo, 2017).

At the UG level, a wider span of predictors was identified. Regression analysis indicated that measures of moral practice in UGs were a useful predictor of academic integrity ($p = .003$). The results are noteworthy on several fronts: the scores from the MDSP indicated that UGs placed a high value on adherence to moral standards, and the requirement to practice ethically. The findings are congruent with previous research demonstrating that health science students

Table 2. Academic integrity, tendencies towards dishonesty, moral development and perceived stresses comparative mean scores (UG: $n = 609$; GEM: $n = 92$).

	UG		GEM	
	Mean	SD	Mean	SD
ADS CHEAT Mean total score	10.02	± 2.76	10.01	± 1.63
ADSC mean cheat frequency score	1.26	± 0.35	1.22	± 0.25
ADSC mean seriousness rating score	4.19	± 0.70	4.15	± 0.69
ADCPES mean cheat frequency score	1.11	± 0.31	1.11	± 0.18
ADCPES mean seriousness rating score	4.59	± 0.64	4.57	± 0.57
MDSP Factor 1: Authoritative standards	15.55	± 1.87	15.18	± 2.09
MDSP Factor 2: Public meaning	11.77	± 1.37	11.90	± 1.46
MDSP Factor 3: Moral practice	14.03	± 2.34	13.22	± 2.69
MDSP Factor 4: Common values	9.91	± 1.55	9.27	± 1.77
ADTC Scale 1: Tendency towards cheating	3.83	± 0.52	3.79	± 0.44
ADTC Scale 2: Tendency towards dishonesty in assignments, essays and studies such as projects	3.13	± 0.59	3.03	± 0.35
ADTC Scale 3: Tendency towards dishonesty in the process of doing and reporting research	3.88	± 0.65	4.00	± 0.53
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	3.11	± 0.57	2.95	± 0.44
PASS Factor 1: Pressures to perform	15.01	± 3.04	15.15	± 2.98
PASS Factor 2: Perceptions of workload and examinations	10.48	± 2.72	11.39	± 2.69
PASS Factor 3: Self-perceptions	13.99	± 2.37	14.75	± 2.26
PASS Factor 4: Time restraints	14.66	± 2.84	14.77	± 2.90

UG: undergraduate; GEM: graduate-entry masters; SD: standard deviation; ADS: Academic Dishonesty Scale; ADSC: Academic Dishonesty in the Classroom Setting Scale; ADCPES: Academic Dishonesty in the Clinical/Practice Education Setting Scale; MDSP: Moral Development Scale for Professionals; ADTC: Academic Dishonesty Tendency Scale; PASS: Perceived Academic Sources of Stress.

with a strong sense of moral identity are less likely to cheat in academic settings; and the association of good moral reasoning skills with lower incidences of dishonest academic behaviours (Henning et al., 2013, 2015). A study of UG nursing students concluded that students' commitment to academic integrity are closely connected to personal experience and the development of ethical reasoning skills, with benefits for their practice in the field and classroom settings (Krueger, 2014). Moral development is a key element in students' education and training and paramount in occupational therapy where practitioners' decision making will often have ethical implications. Therefore, substantiating the usefulness of moral practice as a predictor of students' academic integrity is an important finding.

The tendency towards cheating (measured by the ADTC) was also identified as a significant predictor of UGs' academic integrity ($p = .005$) which aligns closely to regression analysis of two other ADTC subscales: *tendency towards dishonesty in providing appropriate references and acknowledgements* (predictive of academic integrity in UG ($p = .006$) and GEM ($p = .017$) students) and *tendency towards dishonesty in the process of doing and reporting research* (predictive of UG students' ($p = .016$) academic integrity). On the ADTC tendency towards cheating scale, UGs students'

scores equate to a high risk of engaging in dishonest academic behaviours, yet their responses to individual items suggest a clear demarcation exists in their minds between practices involving coursework infringements and those relating to cheating in examinations. For example, UG and GEM students identified the use of notes and mobile phones in closed-book tests or copying from a fellow student while writing a test as completely dishonest behaviours. Other behaviours, however, were regarded as less serious breaches of academic integrity, such as not referencing source material or paraphrasing material from books, journal articles or websites without referencing the original source.

This reflects Okoroafor et al.'s (2016) contention that dishonest behaviours involving coursework are more ambiguous and debatable than those related to cheating in examinations. One explanation is the collective learning process where collaborative learning among peers and students liaising and working closely with each other on assignments leads to breaches (often unwittingly) of institutions' requirement for students to produce and submit their own work.

It also reflects technological advances over the last decade and the ease with which sources of information can be accessed and disseminated, and where the verbatim use of original material from online sources

Table 3. Predictors of general academic integrity of UG ($n = 609$) and GEM ($n = 92$) occupational therapy students based on bootstrapped linear regression analysis.

	Before bootstrapping					After bootstrapping ^a					
	B ^b	SE B	β	t	p	PC	PC ²	SE B	p	BCa 95 % CI Lower	BCa 95 % CI Upper
Predictors for UG students											
(Constant)	28.26	3.822		7.395	.001			4.720	.001	18.092	38.855
Age	.705	.248	.113	2.840	.005 ^c	.115	.0132	.322	.028 ^c	.152	1.330
Gender	-2.247	.540	-.163	-4.161	.001 ^c	-.168	.0282	.607	.001 ^c	-3.437	-1.070
Grade point average	-.600	.260	-.093	-2.306	.021 ^c	-.094	.0088	.250	.015 ^c	-1.089	-.099
MDSP Factor 1 Authoritative standards	-.007	.134	-.002	-.049	.961	-.002	na	.133	.960	-.259	.247
MDSP Factor 2 Public meaning	-.425	.187	-.095	-2.271	.024 ^c	-.093	.0086	.196	.028 ^c	-.796	-.068
MDSP Factor 3 Moral practice	.299	.108	.114	2.761	.006 ^c	.112	.0125	.105	.003 ^c	.096	.490
ADTC Scale 1: Tendency towards cheating	-1.457	.516	-.122	-2.826	.005 ^c	-.115	.0132	.505	.005 ^c	-2.521	-.405
ADTC Scale 3: Tendency towards dishonesty in the process of doing and reporting research	-1.135	.411	-.120	-2.762	.006 ^c	-.112	.0125	.474	.016 ^c	-2.042	-.187
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	1.504	.441	.140	3.412	.001 ^c	.138	.0019	.544	.006 ^c	.505	2.473
PASS Factor 1: Pressures to perform	-.073	.082	-.036	-.899	.369	-.037	na	.083	.395	-.238	.090
PASS Factor 3: Self-perceptions	-.090	.109	-.035	-.833	.405	-.034	na	.104	.378	-.292	.102
Predictors for GEM students											
(Constant)	29.40	10.87		2.704	.008			9.633	.003	10.652	49.516
Gender	-3.99	1.607	-.236	-2.479	.015 ^c	-.261	.0681	1.883	.036 ^c	-7.736	-.621
No. of hours of direct time spent attending occupational therapy education programme each week	-.059	.092	-.062	-.642	.522	-.070	na	.074	.408	-.209	.110
No. of hours per week spent in paid employment while attending your occupational therapy education programme	.122	.080	.151	1.520	.132	.164	na	.089	.185	-.059	.302
MDSP Factor 1 Authoritative standards	.480	.352	.131	1.363	.176	.147	na	.371	.201	-.246	1.438
ADTC Scale 1: Tendency towards cheating	-1.746	1.686	-.100	-1.035	.303	-.112	na	1.319	.173	-4.171	.895
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	-4.656	1.637	-.269	-2.844	.006 ^c	-.296	.0876	2.009	.017 ^c	-8.731	-2.097
PASS Factor 2: perceptions of workload and examinations	.487	.285	.171	1.707	.091	.183	na	.261	.062	.013	.929

^aUnless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

^bB remained unchanged after bootstrapping.

^cStatistically significant p -values ($p < 0.05$).

GEM: graduate-entry masters; Constant: γ -intercepts of regression line; B: unstandardised beta coefficient; SE B: standard error for the unstandardised beta; β : standardised beta; t: the t test statistic; CI: confidence interval; PC: Part Correlation; PC²: Part Correlation Squared; BCa: bias-corrected and accelerated; MDSP: Moral Development Scale for Professionals; ADTC: Academic Dishonesty Tendency Scale; PASS: Perceived Academic Sources of Stress; na: not applicable.

Table 4. Predictors of academic integrity in the classroom setting of UG ($n = 609$) and GEM ($n = 92$) occupational therapy students based on bootstrapped linear regression analysis.

	Before bootstrapping					bootstrapping ^a					
	B ^b	SE B	β	t	p	PC	PC ²	SE B	p	BCa 95 % CI Lower	BCa 95 % CI Upper
Predictors of UG students											
(Constant)	56.945			13.719	.001			8.237	.001	43.478	71.761
PASS Factor 4: Time restraints	.008	.127	.003	.066	.947	.003	na	.148	.958	-.273	.268
PASS Factor 2: Perceptions of workload and examinations	-.186	.138	-.073	-1.356	.176	-.051	na	.145	.202	-.482	.106
PASS Factor 1: Pressures to perform	-.231	.110	.110	-2.106	.036 ^c	-.080	.0064	.152	.130	-.591	.085
Scale 1: Tendency towards cheating	-2.131	.590	-.157	-3.612	.001 ^c	-.137	.0188	.779	.005 ^c	-3.668	-.677
ADTC Scale 2: Tendency towards dishonesty in assignments, essays and studies such as projects	.224	.530	.019	.423	.672	.0165	na	.458	.618	-.598	1.014
ADTC Scale 3: Tendency towards dishonesty in the process of doing and reporting research	-2.199	.456	-.204	-4.725	.001 ^c	-.179	.0320	.677	.001 ^c	-3.630	-.876
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	-.287	.533	-.024	-.539	.590	-.020	na	.535	.596	-1.309	.798
No. of hours of direct time spent attending occupational therapy education programme each week	-.110	.052	-.083	-2.130	.034 ^c	-.087	.0076	.044	.012 ^c	-1.189	-.029
No. of hours of indirect time spent attending occupational therapy education programme each week	-.023	.030	-.030	-.769	.442	-.029	na	.026	.371	-.069	.025
No. of hours per week spent in paid employment while attending your occupational therapy education programme	.059	.033	.069	1.771	.077	.067	na	.034	.086	-.013	.125
Grade point average	-.051	.295	-.007	-.172	.864	-.007	na	.314	.886	-.725	.557
MDSP Factor 1 Authoritative standards	-.199	.156	-.053	-1.277	.202	-.048	na	.135	.144	-.460	.080
MDSP Factor 2 Public meaning	-.092	.216	-.018	-.425	.671	-.016	na	.254	.692	-.635	.477
MDSP Factor 3 More practice	.053	.148	.018	.357	.721	.014	na	.154	.750	-.240	.338
MDSP Factor 4 Common values	-.460	.235	-.102	-1.961	.050 ^c	-.074	na	.313	.145	-1.126	.180
Predictors of GEM students											
(Constant)	9.507	6.382		1.490	.140			6.392	.138	-3.182	22.197
Age	-.529	.422	-.130	-1.255	.213	-.135	na	.412	.215	-1.367	.309
MDSP Factor 1 Authoritative standards	.003	.260	.001	.010	.992	.001	na	.265	.982	-.515	.520
MDSP Factor 2 Public meaning	.371	.384	.108	.965	.337	.104	na	.374	.327	-.393	1.134
MDSP Factor 3 More practice	.031	.286	.016	.107	.915	.012	na	.266	.919	-.538	.599
MDSP Factor 4 Common values	.629	.475	.223	1.323	.189	.142	na	.465	.193	-3.16	1.573
PASS Factor 1: Pressures to perform	.379	.182	.226	2.081	.040 ^c	.220	.0484	.185	.045 ^c	.017	.741

^aUnless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

^bB remained unchanged after bootstrapping.

^cStatistically significant p -values ($p < 0.05$).

GEM: graduate-entry masters; Constant: y -intercepts of regression line; B: unstandardised beta coefficient; SE B: standard error for the unstandardised beta; β : standardised beta; t: the t test statistic; CI: confidence interval; PC: Part Correlation; PC²: Part Correlation Squared; BCa: bias-corrected and accelerated; MDSP: Moral Development Scale for Professionals; ADTC: Academic Dishonesty Tendency Scale; PASS: Perceived Academic Sources of Stress; na: not applicable.

Table 5. Predictors of academic integrity in the fieldwork setting of UG ($n = 609$) and GEM ($n = 92$) occupational therapy students based on bootstrapped linear regression analysis.

	Before bootstrapping					After bootstrapping ^a					
	B ^b	SE B	β	t	p	PC	PC ²	SE B	p	BCa 95 % CI Lower	BCa 95 % CI Upper
Predictors of UG students											
(Constant)	19.04	1.556		12.238	.001			3.982	.001	13.079	25.632
Gender	-.921	.246	-.149	-3.738	.001 ^c	-.151	.0228	.324	.008 ^c	-1.653	-.242
No. of hours per week spent in paid employment while attending your occupational therapy education programme	.021	.012	.070	1.773	.077	.072	na	.019	.306	-.009	.055
MDSP Factor 1: Authoritative standards	-.094	.061	-.063	-1.545	.123	-.063	na	.066	.176	-.242	.048
MDSP Factor 2: Public meaning	-.144	.083	-.071	-1.742	.082	-.071	na	.107	.210	-.403	.069
ADTC Scale 1: Tendency towards cheating	-.678	.238	-.127	-2.855	.004 ^c	-.116	.0135	.298	.022 ^c	-1.364	-.071
ADTC Scale 2: Tendency towards dishonesty in assignments, essays, and studies such as projects	-.043	.212	-.009	-.204	.839	-.008	na	.193	.834	-.445	.337
ADTC Scale 3: Tendency towards dishonesty in the process of doing and reporting research	-.367	.189	-.086	-1.945	.052 ^c	-.079	na	.215	.102	-.824	.069
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	-.144	.214	-.030	-.674	.501	-.027	na	.201	.488	-.565	.246
Predictors of GEM students											
(Constant)	6.336	2.009		3.154	.002			2.091	.003	1.847	10.084
Gender	-.876	.358	-.244	-2.449	.016 ^c	-.255	.0650	.388	.034 ^c	-1.714	-.137
Grade point average	.159	.199	.084	.799	.427	.086	na	.251	.511	-.285	.666
ADTC Scale 1: Tendency towards cheating	.499	.368	.135	1.358	.178	.145	na	.534	.384	-.574	1.522
ADTC Scale 4: Tendency towards dishonesty in providing appropriate references and acknowledgements	.338	.372	.092	.907	.367	.097	na	.356	.302	-.219	1.278
PASS Factor 1: Pressures to perform	.108	.056	.198	1.925	.058 ^c	.203	.0412	.045	.018 ^c	.028	.192

^aUnless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

^bB remained unchanged after bootstrapping.

^cStatistically significant p -values ($p < 0.05$).

GEM: graduate-entry masters; Constant: γ -intercepts of regression line; B: unstandardised beta coefficient; SE B: standard error for the unstandardised beta; β : standardised beta; t: the t test statistic; CI: confidence interval; PC: Part Correlation Squared; BCa: bias-corrected and accelerated; MDSP: Moral Development Scale for Professionals; ADTC: Academic Dishonesty Tendency Scale; PASS: Perceived Academic Sources of Stress; na: not applicable.

without due accreditation is not always considered by students as academic misconduct. The issue is compounded by students' use of online paraphrasing tools and article spinners that avoid detection by software programmes such as Turnitin (Rogerson & McCarthy, 2017). Some commentators have suggested that the high rates of dishonest practices in producing assignments are an inherent danger of web-based study framework within health science programmes that are not augmented by clearly defined academic integrity policies (Oran et al., 2016).

Predictors of academic integrity in classroom settings

Within the classroom setting, both UG and GEM students scored high on tendencies towards dishonesty in the process of doing and reporting research; however, only in UGs was it found to be a strong predictor of academic integrity ($p = .001$). This suggests that students struggle with poor research protocols; for example, the importance of generating original qualitative and quantitative data in projects and appropriate acknowledgement of research reports in their own work. In conjunction with regression analysis demonstrating the tendency towards cheating scale's value as a predictor of honest academic behaviours in the classroom ($p = .008$), these predictors represent useful 'red flag' markers. Deficiencies in academic integrity in the classroom context represent a challenge for educators as high standards in research protocols are essential in the health sciences. Within occupational therapy, Mitchell (2015) emphasises the importance of technical approaches such as authentic fieldwork experiences and case-based methods in developing students' knowledge about how to conduct studies and the appropriate use of original sources for research purposes.

The predictive value of the number of hours spent in direct education ($p = .013$) in anticipating UGs' academic integrity in the classroom environment reflects existing research that determined a positive correlation between year level of academic study and academic performance (Brown & Murdolo, 2017; Richardson, 2010). This infers that increased attendance at lectures and participation in small group work in the early years of study, during which UGs are taught foundational knowledge subjects (e.g. occupational science, psychology, physiology), correlate with improved performance in the classroom setting across the course of study. A range of didactic and assessment methods are used in the first years of the Monash University occupational therapy programme including scenario-based learning in which students develop their own learning objectives based on authentic case studies. Through assessment of students' problem-solving, practical, and presentation skills across the years of study, students are expected to

have acquired effective and efficient study skills and learning strategies by their final year. There is also evidence that occupational therapy programmes in which students are encouraged to be reflective and to draw on their own field experiences is associated with the development of sophisticated cognitive skills that allow students to apply their knowledge at a deeper level (Mitchell, 2015). The number of hours spent in direct education per week can therefore be considered a useful predictor of classroom academic integrity at UG level.

For GEMs, the sole predictor of academic integrity in the classroom was age, and the effect was only moderate ($p = .048$). This reflects the lack of consensus within the literature regarding the influence of age on academic integrity. Previous research has demonstrated variable findings; for example, Seah et al. (2011) acknowledge the importance of mature students' previous experiences in the classroom and practice settings in their acquisition of independent learning skills, reflective practice and group work skills. In contrast, Shanahan (2004) and Watson (2013) contend that age is not a proven predictor of academic performance, nor is it associated with academic success, in occupational therapy students. The findings from our research indicate that age is only a marginal predictor of academic integrity and therefore cannot be considered a reliable marker.

Predictors of academic integrity in fieldwork settings

Regression analysis revealed that gender was a predictive factor of students' academic integrity in the field in both UGs ($p = .001$) and GEMs ($p = .016$), tendency towards cheating ($p = .004$) was a predictor for UGs and pressures to perform ($p = .05$) was a predictor in GEMs. At the graduate level, according to Seah et al. (2011), females are more adept at meeting personal challenges and aware of opportunities to develop their clinical reasoning and relational skills, an awareness drawn from concentrated periods of professional practice placements as part of their Master of Occupational Therapy Practice course.

The self-confidence of masters-level students is reflected in the finding that GEMs experience slightly less stress in relation to the excessive pressures generated by competition among peers, parental expectations and criticism from supervisors. It is possible that GEMs' wider academic experience and deeper understanding of applying theory in the multi-disciplinary field context provide the motivation and self-confidence to facilitate an awareness of the importance of applying academic integrity. In contrast to UG colleagues who spend a greater proportion of their time in the classroom environment where teaching formats place less emphasis on individual guidance, supervision

and feedback and students are exposed to a more dynamic, competitive academic environment (Bonsaksen, 2016). The other issue for GEMs is the larger number of scheduled academic contact hours and shorter period of enrolment compared to UG students. GEMs are typically enrolled for two 36-week academic years whereas UG students are typically enrolled for two 12-week academic semesters per year. In other words, GEMs students often are under pressure to perform because of the more intense nature of completing a health professional graduate-entry master's degree.

Implications for practice

This study identified a range of predictors of academic integrity, particularly at the UG occupational therapy level. The findings on gender, GPA and hours spent in direct and indirect education support existing evidence of their predictive value while measures of tendencies to engage in dishonest academic behaviours in the classroom and fieldwork settings, pressures to perform and self-perceptions add new findings to the cognate knowledge base on academic integrity in allied health students. The results will generate improved understanding of the academic perceptions of, and challenges faced by, UG and GEMs students. Encouraging students to achieve and maintain higher standards of academic integrity through proactive educational initiatives such as role play, scenario-based learning and mentoring programmes will engender positive outcomes for the profession in terms of students' understanding of, and commitment to, academic integrity policies. Universities need to clearly signpost to students what their academic misconduct and plagiarism policies are and also provide them with clear examples of what constitutes academic integrity misconduct at all stages of their enrolment.

Limitations

The convenience sampling approach was used to recruit participants and the use of self-report scales which can be prone to bias are notable limitations. It is possible that students may not have reported all instances of dishonest academic practices and behaviours they may have engaged in. The self-reporting of GPA was also a noted drawback since participants may have not been completely honest when answering this item. However, for ethical reasons, it was not possible to retrieve this information from the student records of students. Detailed demographic information about the participants, including cultural background, living circumstances and socioeconomic status, were not collected; it is therefore acknowledged other factors may also

predict academic integrity in students. Another limitation may be the approaches and modes of delivery of occupational therapy curricula may differ from one country to another. This may limit the generalisability of the study findings. One final limitation is the potential for gender bias in the sample and the resultant data collected. The majority of the respondents were female; however, the sample of respondents is representative of the occupational therapy profession itself.

Future research

Research exploring the sociocultural backgrounds of students is recommended to explore the significance of domestic or international origin as a predictor of academic integrity in students. The generation of qualitative and longitudinal data would also provide additional insights into other potential predictors and exploration of whether the predictors of academic integrity change over the duration of UG or GEMs period of study. A comparison of UG or GEMs students enrolled in health professional courses with students enrolled in more subject-based courses (e.g. chemistry, biology, physiology, history, geography, linguistics, etc.) in relation to academic integrity issues would be informative.

Conclusion

This study identified a range of demographic and self-report variables that were predictive of academic integrity in UG and GEM occupational therapy students. Confirmation of the predictive value of self-reported measures of tendencies towards cheating, moral practice and self-perceptions in UGs and pressures to perform in GEMs are new findings that will assist in the identification of vulnerable students. The challenge for educators in occupational therapy is to ensure that students are aware of the need to display integrity and honesty in all aspects of their academic work, irrespective of entry level and setting. Further research in this area is recommended.

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Author contributions

Author contributions for this manuscript are as follows: (i) study conception and design: TB; (ii) data collection, analysis

and interpretation: TB, SI, AL and JE; (iii) manuscript drafting and writing: TB, SI, AL and JE; and (iv) final approval of the manuscript version to be submitted: TB, SI, AL and JE.

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