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The temptation to cheat in online exams: moving beyond the binary discourse of cheating and not cheating

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Abstract

Discussions around assessment integrity often focus on the exam conditions and the motivations and values of those who cheated in comparison with those who did not. We argue that discourse needs to move away from a binary representation of cheating. Instead, we propose that the conversation may be more productive and more impactful by focusing on those who do not cheat, but who are tempted to do so. We conceptualise this group as being at risk of future cheating behaviour and potentially more receptive of targeted strategies to support their integrity decisions. In this paper we report on a large-scale survey of university students ($n = 7{,}511$) who had just completed one or more end of semester online exams. In doing so we explore students' reported temptation to cheat. Analysis surrounding this "at risk" group reveals students who were Tempted ($n = 1379$) had significant differences from those who Cheated ($n = 216$) as well as those who were Not tempted ($n = 5916$). We focus on four research questions exploring whether there are specific online exam conditions, security settings, student attitudes or perceptions which are more strongly associated with the temptation to cheat. The paper offers insights to help institutions to minimise factors that might lead to breaches of assessment integrity, by focusing on the temptation to cheat during assessment.

Keywords: Online exams, Temptation to cheat, University, Survey

Introduction

Research on exam cheating has typically focused on the characteristics of those who cheated and the factors that influenced them, including the conditions and types of examinations (Jenkins et al. 2022; Noorbehbahani et al. 2022). Some studies go further and compare the differences between those who uphold integrity standards and those who breach them, such as when experiencing proctoring (Gudiño Paredes et al. 2021). Although these data are useful in presenting an overall picture of the context of examination misconduct in the university sector, similar to research on other types of academic misconduct, they tend to create a binary image of cheating: the cheaters and the

non-cheaters. Through the bifurcation of dis/honest conduct, a whole sub-group of students are left out of research and discussion: those who are tempted to cheat, but have not engaged in that behaviour.

Most existing research investigating academic integrity and misconduct in higher education has provided explanation and context for why students do or not do engage in dishonest practices assessment practices. While these studies are able to provide readers with an in-depth understanding of reasons for or against integrity, for those students sitting in a third group - the tempted - understanding and discussion of their situations are scant. Unless educators understand the factors associated with temptation, they, and their institutions, may unwittingly create situations where the tempted become the cheaters. In addition, understanding why someone was tempted, but nevertheless did not cheat, may reveal particularly useful strategies in supporting students to avoid breaching exam regulations intended to ensure integrity.

Therefore, the project of which this paper forms a part, set out to better understand those who were tempted, and the contextual, intrapersonal and interpersonal dilemmas that potentially lead to a tipping point of behaviour. This paper marks the beginning of this journey, describing the correlations between temptation and four key areas that are generally assumed to reduce or impact cheating behaviour: online security systems, exam conditions (such as being open- or closed-book, location of exam, duration, and exam window), prior exam experiences (knowledge or perception of peer cheating), and student attitudes towards integrity.

Cheating and the temptation to cheat

Many studies have provided evidence and reasoning for why students do or do not engage in academic cheating. Studies considering plagiarism, contract cheating, outsourcing or cheating more broadly have found some commonalities in the reasons why students do not complete their university assignments with integrity. Researchers globally find some agreement in the situational or personal reasons that their students report causes them to engage in misconduct, and include: Poor time management and procrastination (Siaputra 2013; Wallace & Newton 2014); student perception of staff apathy or lack of institutional emphasis on academic integrity (Husain et al. 2017); perceived seriousness of cheating/integrity (Curtis and Popal 2011); dissatisfaction with the learning environment (Bretag et al., 2018, Moss et al. 2018); and pressures placed on students from university or other sources (Brimble, 2016). Various studies have also explored the relationship between student characteristics and cheating. This includes student attitudes towards integrity (Dyer et al. 2020; Tremayne & Curtis, 2021); their knowledge of integrity rules and consequences (East 2016; Morris 2016); low confidence and resilience (Moss et al. 2018); a competitive mindset (Barbaranelli et al. 2018); low self-control (Tremayne and Curtis 2021); perceived opportunities to cheat (Baird and Clare, 2017); as well as their awareness of peers cheating (Awdry and Ives 2021). Examination cheating, whilst being influenced by these factors, also has its own body of work due to the specific condition associated with undertaking academic examinations.

Cheating in exams has been a persistent and seemingly prevalent problem in higher education. Prior to online exams, cheating in paper-based exams has been reported at various rates, such as 51.8% (Genereux and McLeod 1995), and 24% (Chapman et al.

2004). More recent research into online exam cheating has reported higher rates of 62% (Dyer et al. 2020), 58.4% (Jenkins et al. 2022), and 70% (Pleasants et al. 2022). While this affirms the need for online exams to be given particular attention, there are a variety of contributing, and possibly confounding, factors that need to also be considered.

Studies on examination cheating have associated cheating variance with the conditions of the exams themselves, such as the number of exams students are required to sit, exam windows, and context or weighting of the exam (Bilen and Matros 2021; Hylton et al., 2016). Open- or closed-book exams have also been found to have an impact on the student experience in preparing for exams, and in rates of cheating (Green et al. 2016; Ng 2020). Other studies have concluded that the type of exam and exam security can impact cheating rates (Gudiño Paredes et al. 2021; Harper et al. 2021). Interestingly, some have argued that the existence of exam security systems, such as proctoring, inherently creates an environment of distrust which in turn can encourage some of the behaviours that the security seeks to avoid (Lee and Fanguy 2022; Smith et al. 2016). Such arguments highlight the interplay between exam conditions and student perceptions and attitudes.

Both groups of studies, those focusing on exam conditions and those on situational or personal variables, have sought to understand the association between the factor in question and actual cheating behaviour. In contrast, this study proposes that it may be valuable to understand when and why students are tempted but choose not to cheat. In doing so we may gain better insights regarding the "tipping point": what determines a choice made either to cheat or not to cheat. We investigate the proposition that temptation is, in and of itself, a useful explanatory condition that can assist in understanding the behaviours associated with academic integrity.

Although we could find relatively few previous studies with a similar focus, most being more than twenty years old and unrelated to online examinations, one existing strand of research has focused on intrapersonal and interpersonal factors that impact on student's perceived need to succeed which can in turn lead to cheating. These factors include fear of failure, as well as the perceived desirability or need to succeed in the context of social pressures such as peer groups and family, a parallel with research from studies focussed on cheating. For example, Jacobson et al. (1970), in a controlled experiment, found that participants with a high requirement for social approval were more often tempted to cheat when facing failure in tasks, than those with lower social-desirability scores. In addition, participants with high scores on self-satisfaction (achieved through meeting their own expectations of success and ideal performance levels), combined with high need for social approval, were more likely to cheat when faced with the possibility of failure or not meeting social expectations (Jacobson et al. 1970). The implications of risk of failure were also explored in an experimental study by Houston (1978), who found students more likely to be tempted to cheat, or engage in cheating, on a test when they were faced with a high chance of failure in a scenario which would reward success. In particular, Houston indicated that students who were uncertain of success were more likely to be tempted to cheat, when compared with those who were more certain of their outcome—regardless of whether it was good or not.

The power of external influences impacting a person's behaviour has also been a focus for criminological research in non-academic contexts which argues that people may well have the propensity to cheat, and are tempted to do so when the right opportunities

present, but are prevented from doing so through various social and internalised personal controls (see Gottfredson and Hirschi 1990). These social and internalised controls were a focus for an experimental study by Gino et al. (2011) which was designed to test the effect of self-control on temptation and actual cheating (through a control experiment with monetary incentives, low deterrence, and high opportunities to cheat); and found that those who had had their self-control reserves depleted, were more likely to cheat. In particular, they identified that self-control resource depletion impaired participants' ability to recognise moral issues and thus more likely to engage in unethical behaviour. Moreover, moral identity was found to moderate the effect of self-regulatory resource depletion. Gino et al. (2011) went on to identify two key factors that were found to deplete self-regulatory resource. First, resisting temptation was found to deplete self-regulatory resources; this finding, if applied to an academic context, would suggest that students required to sit multiple exams in close time proximity are less likely to be able to resist temptation. Second, depletion was also associated with sleep deprivation (Gino et al. 2011), something which can be aligned to the stresses placed on students during key exam times when they are likely to be tired, have extra pressure placed on them and may have reduced self-control, resulting in difficult to resist dishonest behaviour (see also Chen et al. 2014; Hodgkinson et al. 2016).

As noted already, there are few studies which deal with the condition of temptation in relation to academic integrity. When considering the broader field of temptation in general, as well as academic integrity studies, there is considerable diversity in explanations. This is not only in terms of the factors involved but also in what appear to be fundamental assumptions about the nature of cheating. Some studies frame individuals as having a propensity to cheat, which is manifested given the 'right' conditions, other studies frame individuals as reticent participants, that is, only likely to cheat if conditions create a perceived or real situation of sufficient duress. The practical implications of these fundamentally different framings are that practitioners are faced with calls to inhibit cheating propensity (e.g. reducing opportunity through proctoring), whilst at the same time hearing calls to support integrity decisions (e.g. via integrity training).

In our project we have drawn on a broad socio ecological perspective in which we assume complex interaction between setting, intrapersonal, interpersonal, developmental and wider social, organisational and cultural factors. For the purposes of this paper we adopt the idea that cheating, and not cheating, are contextually specific behavioural decisions. While for some students the decision to cheat/not-cheat may be subconscious or routine, for others it may be more complex. In this paper we set out to explore this idea by identifying those students who were tempted to cheat, but who chose not to. Through understanding these students in relation to others, we may be better placed to understand the tipping point of cheating and not cheating.

We focus on four research questions for this paper as a way to begin exploring the influence of setting and social/organisational factors on the temptation to cheat:

Is there a relationship between temptation to cheat and:

(R1) exam conditions,
(R2) exam security,
(R3) students' attitude towards integrity, and.

(R4) students' knowledge of others' cheating behaviours?

This work is exploratory in nature. We seek to understand when temptation (but not cheating) occurs, and if that pattern is similar to those who were not tempted, or those who cheated. Understanding these similarities and differences may shed light on future academic integrity interventions and practices, as well as helping to guide future research.

Methods

This cross-sectional study was conducted at a large Australian university in which all students who sat a formal end-of-semester exam during Semester 1, 2021 were invited to complete a survey. The survey was open for 3.5 weeks during the exam period. There were 85,332 exam sittings by 39,308 students, and the findings in this paper are based on 7,511 fully completed anonymous surveys. The survey took 25 min to complete and explored student experience and integrity in various exam conditions, proctoring and exam security systems. Further details on the survey, including its creation is reported in (Henderson et al. 2023). In addition to gathering information on students positive and negative exam experiences, the survey asked students to self-report cheating behaviour in their recent exam, or - if they did not cheat - their degree of temptation to cheat.

Of the whole sample ($N=7,511$), 2.9% ($n=216$) self-reported cheating in the exam, and the remaining 97.1% ($n=7,295$) reported they did not break the exam rules. Of the students who did not break the exam rules, 81.1% ($n=5,916$) said that they were *not at all* tempted to cheat, whilst 18.9% ($n=1,379$) reported they were tempted. Of the students who were tempted, 69.9% ($n=964$) reported they were *slightly* tempted, 22.4% ($n=309$) were *moderately* tempted, 4.8% ($n=66$) were *very* tempted and 2.9% ($n=40$) were *extremely* tempted.

This paper presents key descriptive data and summaries of statistical analysis in relation to temptation and the four key areas of interest: exam conditions, security, attitude towards integrity, and knowledge of others' cheating behaviours. In some cases, we have provided a summary of the statistical analysis rather than the full tables with the intention of maintaining a focus on key findings; full analysis is available upon request. For the same reason we have not provided analysis of overall demographics and general trends since these can be found in our earlier publication which focused on cheating behaviours (Henderson et al. 2023).

Results

Exam conditions

Table 1 presents the raw frequencies of the sample that were Not tempted, Tempted, and Cheated for each exam condition, as well as the Chi-Square tests for each exam condition. Chi-Square test of contingencies analyses compared each exam condition variable to the cheating temptation variable. The findings revealed that there were statistically different levels of temptation and cheating behaviour across each of the exam conditions, with the exam window analysis representing a medium effect size (the largest effect size of all five analyses), and the remaining four analyses represented small effect sizes.

Table 1 Exam conditions by integrity behaviours

	Not tempted (*n* = 5916)		**Tempted (*n* = 1379)**		**Cheated (*n* = 216)**		**Not tempted vs. Tempted vs. Cheated**		
	n	**%**	***n***	**%**	***n***	**%**	***Chi-square***	***p***	**φ**
Exams completed this semester (so far)							χ^2 (8, *N* = 7511) = 35.70	**< 0.001**	0.22[a]
1	3134	79.6%	704	17.9%	99	2.5%			
2	1333	77.5%	347	20.2%	39	2.3%			
3	638	75.9%	173	20.6%	30	3.6%			
4	479	77.6%	106	17.2%	32	5.2%			
5 or more	332	83.6%	49	12.3%	16	4.0%			
Exam location							χ^2 (4, *N* = 7511) = 21.10	**< 0.001**	0.18[a]
On-campus	158	80.6%	30	15.3%	8	4.1%			
Remote (at home)	5657	78.8%	1329	18.5%	196	2.7%			
Remote (somewhere other than home)	101	75.9%	20	15.0%	12	9.0%			
Exam materials							χ^2 (2, *N* = 7511) = 70.07	**< 0.001**	0.10[a]
Open book	3248	82.1%	586	14.8%	121	3.1%			
Closed book	2668	75.0%	7963	22.3%	95	2.7%			
Exam duration							χ^2 (6, *N* = 7511) = 95.78	**< 0.001**	0.28[a]
1 h 40 min	184	65.9%	86	30.8%	9	3.2%			
2 h 10 min	4288	78.7%	994	18.2%	167	3.1%			
2 h 30 min	585	90.8%	50	7.8%	9	1.4%			
More than 2 h 30 min	859	75.4%	249	21.9%	31	2.7%			
Exam window							χ^2 (4, *N* = 7511) = 173.77	**< 0.001**	0.33[b]
12 h	396	81.1%	43	8.8%	49	10.0%			
24 h	199	82.2%	21	8.7%	22	9.1%			
No exam window (i.e. exam had a set time)	5321	78.5%	1315	19.4%	145	2.1%			

Total Sample (*N* = 7511). Where cell sizes were small and less than 5, the category was not included in the Chi-Square analysis. Bold = significant $p < .05$.[a] Small effect size.[b] Medium effect size

Post-hoc comparisons of column proportions were conducted between pairs of groups within an exam condition and a Bonferroni correction was applied for all pairwise comparisons. In relation to temptation, post-hoc comparisons revealed that students were significantly more tempted to cheat if they had a set exam time (i.e. no window). They were also more tempted if they had completed two or three exams, and if the exam was closed-book. Students who sat the shortest exam duration were significantly more likely to be tempted to cheat than students who sat all other exam durations. Conversely, students who sat the longest exam duration were also more tempted to cheat than students who sat exams in the middle duration. No statistical differences were found between temptation and exam location (i.e. on campus or off-campus / home).

In relation to cheating, students were more likely to cheat if they had completed four exams, compared to if they had completed one or two exams (at the time of surveying). They were also more likely to cheat if they completed their exam remotely somewhere other than home, as well as if their exam had a 12- or 24-hour window.

Table 2 Exam security by integrity behaviours

	Not tempted (*n* = 5916)		Tempted (*n* = 1379)		Cheated (*n* = 216)		Not tempted vs. Tempted vs. Cheated		
	n	%	*n*	%	*n*	%	*Chi-square*	*p*	φ
Exam security type							χ^2 (6, *N* = 7511) = 82.34	**< 0.001**	0.27[a]
Online supervision with assisted check-in	1937	83.5%	316	13.6%	66	2.8%			
Online supervision with self check-in	2384	78.0%	603	19.7%	70	2.3%			
Without online supervision and with Safe Exam Browser	299	67.5%	120	27.1%	24	5.4%			
Without online supervision	1296	76.6%	340	20.1%	56	3.3%			

Total Sample (*N* = 7511). Bold = significant $p < .05$.[a] Small effect size

Exam security

Table 2 reports on the relationship between exam security type and the three groups: Not tempted, Tempted, and those who Cheated. A Chi-Square test of contingencies revealed that exam security and cheating temptation are related as the analysis was statistically significant, although the association was small. Post-hoc comparisons of pairs revealed that students who experienced no online supervision with Safe Exam Browser were more likely to be tempted to cheat than students sitting exams in all other types of exam security. Furthermore, students who sat an exam that included the highest level of online supervision with assisted check-in were significantly less tempted than all other students.

In relation to cheating, there was a significantly greater proportion of students who cheated in the Safe Exam Browser group compared to students who experienced online supervision, either with assisted check-in or with self-check in. There were no statistical differences found in rates of cheating between the remaining three security types.

Integrity attitudes and awareness of consequences

Table 3 presents the mean values for attitudes towards academic integrity and awareness of consequences for each of the Not tempted, Tempted and Cheated groups. One-Way ANOVAs comparing the mean differences for all three items demonstrate that there were statistically significant differences between the ratings of the three groups, with small effect sizes. As the homogeneity of variance tests were violated, Welch's *F* are reported.

Post-hoc comparisons confirmed a predictable relationship between temptation and the perceived importance of integrity as well as knowledge of consequences of cheating as explained by the university. Students who were in the Not-tempted group reported the greatest positive attitudes towards integrity of the three groups. The Tempted group was less positive than the Not-tempted group, but more positive than those who Cheated. This relationship is logical and affirms that the Tempted students are a distinct group sitting between the other two. However, it is also useful to note that even though the Cheated group was the least positive when compared with the other two groups, the mean values are still high (for example, 4.15 on a 5-point scale).

Table 3 Student integrity attitudes and awareness of rules

	Not tempted (*n* = 5916)	**Tempted (*n* = 1379)**	**Cheated (*n* = 216)**	***One-Way ANOVA***	***Post-hoc differences between groups***		
					Not tempted - Tempted	**Not tempted - Cheated**	**Tempted - Cheated**
I believe academic integrity in exams is important (e.g. not possessing unauthorised materials such as notes, not attempting to cheat)	4.72 (0.64)	4.59 (0.73)	4.15 (0.87)	*Welch's F* (2, 529.91) = 57.36, ***p*< .001**[a]	**	**	**
I believe it is important that exams are supervised (online or in-person)	3.70 (1.22)	3.44 (1.20)	3.54 (1.19)	*F*(2, 7508) = 27.80, ***p*< .001**[a]	**		
My university (educators or others) have explained to me the rules and consequences of cheating	4.63 (0.69)	4.55 (0.73)	4.18 (0.93)	*Welch's F* (2, 532.64) = 31.22, ***p*< .001**[a]	**	**	**

Total Sample ($N = 7511$). Data in the first three columns are Mean (SD). Items are rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). *$p < .05$, **$p < .001$. Bold = significant $p < .001$.[a] Small effect size

In relation to the importance of exams being supervised, the only significant difference found was between the Not tempted and Tempted group, where the Not tempted group were more favourable towards exams being supervised than the Tempted group. However, it is useful to note that despite being the most favourable group, the Not Tempted students' attitudes towards exam supervision were only average in strength (mean of 3.70).

Cheating perceptions

Four items measured students' extent of knowledge regarding whether other students were cheating and getting caught for cheating, both within their course/degree and at university outside their course. We conceptualised this as perceptual proximity to cheating behaviours. Table 4 presents the raw frequencies of students' proximity to cheating behaviours.

To statistically compare if one group reported closer perceptual proximity than another group, the data were treated as continuous (*1* = distant relationship to cheating/getting caught, *4* = close relationship to cheating/getting caught). All four Welch's *F* were statistically significant for all four items ($p < .001$) in relation to cheating and getting caught for cheating, both in relation to course/degree and outside of course, represented by small effect sizes.

Table 4 Student knowledge of others cheating and being caught

	Knowledge of other students in their course/degree			Knowledge of other students at university (outside their course)		
	Not tempted ($n=5916$)	Tempted ($n=1379$)	Cheated ($n=216$)	Not tempted ($n=5916$)	Tempted ($n=1379$)	Cheated ($n=216$)
Knowledge of others cheating						
Never saw nor heard others cheating	66.6%	47.9%	36.6%	56.6%	37.3%	32.4%
Heard rumours others have cheated	18.7%	28.5%	24.1%	25.6%	33.3%	27.8%
Did not see but heard reliable stories that others cheated	11.1%	15.9%	28.2%	13.8%	20.6%	31.5%
Seen others cheat	3.6%	7.7%	11.1%	4.0%	8.8%	8.3%
Knowledge of others getting caught for cheating						
Never heard about others getting caught	67.7%	58.6%	43.1%	60.8%	49.8%	38.9%
Heard rumours others have been caught	16.9%	21.9%	22.2%	21.7%	28.2%	26.9%
Don't know anyone personally but heard reliable stories about getting caught	12.7%	15.2%	25.0%	14.5%	15.8%	27.3%
Know other students who have been caught	2.7%	4.4%	9.7%	3.0%	6.2%	6.9%

Total Sample ($N=7511$)

Post-hoc comparisons (for all four items) revealed that the proximity to other students' cheating and being caught for cheating was statistically significantly different between the three groups. Students who didn't cheat and were not tempted were least likely (of the three groups) to know other students who cheated and if they had been caught. In comparison, students who Cheated were most likely (of the three groups) to have seen others cheat as well as know of other students who had been caught. Finally, Tempted students' proximity to cheating and consequences was in the middle between the Not tempted and Cheated students. While the statistical differences are noteworthy, it is useful to consider that the raw frequencies of those who had close proximity to cheating are relatively low (e.g. only 11.1% of those who cheated had seen others cheat in their course).

Discussion

In response to our first research question, *'Is there a relationship between exam conditions and temptation to cheat?'*, we found that restrictive exam conditions were related to increased temptation to cheat. Of highest statistical significance was the flexibility of the exam window in which students had to complete their exams (i.e., exams that can be sat at any point in a broad window, versus those that must be started at a specified time). Those students who had a set time for their exam (i.e., no window) were the most likely to report being tempted to cheat, however the same condition had the least reported actual cheating (with those reporting cheating more likely to have completed exams in the flexible 12 or 24 h exam window). This suggests that institutions should preference specified exam times; however, they need to be cautious of the significant proportion of students who are tempted to cheat under these conditions. Further research is needed to explore why they were tempted. Sattler et al. (2013) note that increased opportunity is correlated with increased frequency of plagiarism, however this does not explain why there was a greater tendency for students to be tempted to cheat in more restrictive conditions. While it is reasonable to assume that restrictions on exam scheduling can lead

to general stress, it may be valuable to discover what factors are interacting with the condition to make it a significant stressor. For example, such restrictions may simply trigger students' sense of unpreparedness and result in impulsivity or re-evaluation of the cost-benefit analysis of cheating. Research in relation to plagiarism found that procrastination may lead to impulsivity (Siaputra 2013) and that students were influenced by the perceived utility of cheating, that is, their personal sensitivity of the costs and benefits of cheating. Alternatively, it may be related to a specific and actionable concern such as perceived poor exam design (e.g. too many questions), rather than the exam conditions.

Another restrictive exam condition was the length of the exam. In our previous study (Henderson et al. 2023) using the same participant data and in which we compared only two groups, those who cheated and those who did not cheat, we found there was no statistically significant difference in the cheating rates according to the length of exam. This was also found by Pleasants et al. (2022) who analysed detected cheating rates on exam conditions and found that time limits in exams had no effect on cheating behaviours. Based on these finding it would be reasonable for institutions and educators to not consider the length of exam in their exam security designs. However, when we shift from a binary analysis of cheating/not-cheating to include temptation the data provides a somewhat more cautionary finding.

While cheating rates were not found to be correlated with length of exam, we did find that students were more likely to be tempted to cheat in exams with the shortest duration (1 h 40 min). However, the second most likely group to be tempted were those who had the longest exam duration (greater than 2 h and 20 min). These results seem somewhat contradictory, with restrictive time limits relating to increased temptation while permissive time conditions were also related to increased temptation, albeit at a less significant level. In trying to understand this finding, it may be useful to consider that our data does not reveal the form of cheating that students were tempted to engage in. The differences in the length of exam may influence how students perceive the opportunity to cheat, and tempt them to cheat in different ways. This potential explanation is supported by Ng (2020), who observed that the type of cheating was impacted by the time limits set on the exam, with more collusion and outsourcing being detected in students sitting open or long exam windows. In contrast, more plagiarism was found in the restricted and short-time periods, which Ng suggests is due to students perhaps not having enough time to cheat in other ways than quick copy and paste.

Our findings suggest that while rates of cheating may be helpful when making decisions around institutional strategy, the rate of temptation can provide further consideration regarding the degree of risk, and commensurate institutional attention to policy and support structures to ensure temptation does not tip over to cheating.

Our data also supported our second research question, *Is there a relationship between exam security and reported temptation?* Those students with no direct supervision, but who were monitored through a Safe-Exam Browser were the most likely to be tempted to cheat. The same condition also had the highest frequency of cheating. Based on this analysis it is reasonable to conclude that the use of Safe Exam Browser by itself (i.e. without overt proctoring or other security measures) needs to be treated with caution, if not avoided entirely.

However, our findings are not so clear with regards to other security conditions. There were no statistical differences in the frequency of cheating between the remaining three security conditions (online supervision with/without assisted check-in, no online supervision). This means, excluding Safe Exam Browser and based on cheating frequencies, there is no clear support for choosing between proctored or non-proctored online supervision. This finding is somewhat surprising given that literature has often reported the security benefits of proctoring tools in online exams – whether it is in reduced cheating rates (Gudiño Paredes et al. 2021) or the actual or perceived opportunity to cheat (Hylton et al., 2016).

In contrast with our findings relating to cheating frequencies, we found the temptation data to be more revealing. We found that students who experienced online supervision (proctoring) with assisted check-in were least tempted compared to students in all other conditions (online supervision with non-assisted check-in, Safe Exam Browser, and no supervision at all). This suggests that temptation may be particularly inhibited not simply because students were aware of proctoring (e.g. being recorded through their web-cam), but that they had some audio-visual interaction with an exam staff member at the beginning of the exam through the assisted check-in process. A similar phenomenon was observed by Kerkvliet and Sigmund (1999) in their study, in which additional social presence in the form of additional verbal warnings or the additional presence of a proctor resulted in reduced cheating. It could be argued that the assisted check in process – requiring students to actively interact and respond to a human proctor, including showing their Student ID, confirming their name and undergoing confirmation that webcamera and screen recordings are operating - raised the awareness of surveillance and perceived risk. Alternatively, the increased social interaction may have had other impacts, such as affirmation of expectations of integrity. This may be connected with the findings of Gino et al. (2011) in which situational influences such as monitoring was thought to trigger an individual's self-motives to become more salient. The temptation data in this study provides greater confidence for institutions that proctoring environments may help support integrity behaviours, but it also highlights that proctoring in-of-itself may not be the key variable in reducing temptation and thereby risk of cheating.

The third research question was also supported: *Is there a relationship between a student's attitude towards integrity and their temptation to cheat?* The importance placed on integrity was positively associated with integrity behaviour. In other words, students who were not tempted to cheat placed the most importance on integrity, and those who were tempted placed less importance on integrity. Following this pattern, those who cheated rated integrity the least important in comparison with the other two groups. This aligns with other research findings in which students who rated ethics more highly were significantly less likely to cheat (Pate 2018). A similar effect was noticed by Gino et al. (2011) who identified strong moral identity as a moderating influence on temptation to cheat. Even though the findings in our study are not new, they do lend weight to the idea that perceived importance of integrity could be a reliable comparative point when conducting multivariate predictive analysis in relation to student cheating, and temptation to cheat. However, some caution needs to be taken because while there were statistical differences between the three groups, overall, our sample reported very favourable attitudes towards the importance of academic integrity. The group with the

lowest ratings of academic integrity importance (Cheating group) still reported an average of 4.15 (5-point Likert scale with 5 being strongly agree that academic integrity in exams is important). This is a useful reminder that while we might be able to use attitudes towards integrity as a possible indicator, we can only do so as a comparative measure, the individual raw scores can be deceiving.

A similar trend to integrity attitudes was observed in relation to students' awareness of rules and consequences of cheating. The Non-tempted group were more likely to report that their university had explained the rules and consequences than the Tempted group, followed by the Cheated group. Obviously these data are self-reported and some caution needs to be taken in relation to whether their awareness is related to selectiveness in noticing, or actual institutional attempts at educating them regarding rules and consequences. Nevertheless, it does affirm the potential utility of institutions engaging in integrity training, including explaining rules and consequences. Research by Husain et al. (2017) in a review of plagiarism studies, found that when students cited lack of understanding of conventions, definitions of misconduct and university rules this related to their reported attitudes towards plagiarism and integrity, subsequently resulting in increased engagement in academic misconduct. Certainly, earlier research has found that knowledge of (or fear of) outcomes can create a deterrent effect on cheating (Haines et al. 1986; Rettinger and Kramer 2009). In contrast, attitude towards integrity has been found to be more difficult to influence, although some argue that this can be approached through ethical teaching and integrity modules (East 2016; Hughes and Gallant 2016), or through institution-wide honour codes (Christensen Hughes and McCabe 2006).

The complexity around attitudes is highlighted in relation to the item asking students about how important it was that exams are supervised (i.e. proctored). Interestingly there was no statistical difference between the Tempted and Cheated groups. The situation however is made more complex by the fact that the only statistical difference was found to be between the Not tempted and Tempted groups. One interpretation is that students who were not tempted valued supervision more highly as a way to protect the integrity and fairness of their assessment. In contrast the Tempted group did not value supervision because such supervision was in conflict with their inclination to cheat. However, while this interpretation is plausible, it may equally be the case that the tempted students did not value supervision because they had considered cheating but ultimately chose not to cheat, and in that process the presence of supervision was not felt to be important. Any speculation should be treated with caution, but it does reveal a potentially valuable area for future research.

Finally, our fourth research question was also supported: *Is there a relationship between a student's knowledge of others' cheating behaviours and their temptation to cheat?* Students who were Tempted or Cheated were more likely to have reported being aware of other students in their course/university cheating than the Not tempted group. This finding supports prior research which found a positive correlation between known or perceived cheating of others and self-reported cheating rates (Awdry and Ives 2021; Rettinger and Kramer 2009), as well as development of inappropriate norms and attitudes due to the observation of peers engagement in cheating behaviours (Moss et al. 2018). However, it is interesting to note that over a third of the students who cheated had not seen or heard about others cheating, and a further quarter had only heard rumours

of others cheating. An even stronger pattern is revealed when looking at the temptation data – with three quarters of the Tempted students not having heard about others cheating or only having heard about rumours of cheating. While knowledge of others cheating may be associated to an extent with temptation and cheating behaviours, it does not account for the majority.

Another noteworthy point is that our statistical analysis indicated those who were Tempted and those who Cheated were not only more likely to be aware of others cheating but also know of others being caught. Almost 35% of the students who cheated knew or had heard reliable stories of students in their own course being caught. While being aware of consequences may be linked to reduced cheating, our data indicates that knowledge of other students being caught is not a deterrent for many. This is in contrast to other research which has found that risk of being caught creates a deterrent impact on the temptation to cheat in exams (Haines et al. 1986; Smith et al. 2021), and that clearly articulated penalties for cheating can have a reduction on cheating rates (Pleasants et al. 2022). In our own study we do not know how the students perceived the consequences, perhaps seeing them as negligible. Indeed, Moss et al. (2018) and Sattler et al. (2013) note that in the case of plagiarism, the penalties need to be perceived as sufficiently harsh in order to be a deterrent. Nevertheless, it is also worth considering the raw frequencies which reveal 80% of those who were in the Tempted group, and 65% of those in the Cheated group, had never heard about other students getting caught, or had only heard rumours of others getting caught. An implication for future research may be to better understand how and when the knowledge of others being caught impacts on integrity behaviour. With this in mind it may be useful to revisit practices around reporting integrity breaches. A similar conclusion was made by Sattler et al. (2013) in relation to the public dissemination of plagiarism. For a variety of reasons, including the laudable preservation of student privacy, higher education institutions worldwide do not typically report on the frequency, type and outcomes of confirmed cheating cases. However, it is worth exploring how institutional information about confirmed cheating cases and their consequences may be communicated to students and if this has any impact on reducing temptation and cheating.

Limitations

Like most work in this area, the data is self-reported and as a result needs to be treated with caution. The anonymity, immediacy of the survey after the exam, and voluntary nature of the survey strengthen trustworthiness of the responses. However, they also act as limitations – particularly with a risk of self-selection bias. For example, it is logical to assume that students who broke academic integrity rules would be less likely to complete a survey that asks about their exam experience, including integrity behaviours. While not discounting this limitation it is also worth noting that the goal of this paper was not to find the rate of cheating, but instead compare the differences in conditions and attitudes of those who cheated, were tempted, and not tempted.

A further consideration in the analysis of this data is that the exams and survey were conducted during a time of residential lock-down because of the COVID-19 pandemic. This meant that only a small number of students sat the exams on-campus for a variety of equity-related reasons. In addition, even though digital exams had been run at

this institution for some time, for many students this was their first experience of sitting the online exam in a remote (e.g. home) location with exam security measures such as online proctoring.

Concluding remarks

This is an exploratory study based on the simple idea that to understand the influencing factors in cheating behaviours it may be valuable to go beyond binary descriptors of cheating and not-cheating. Our data has identified a large group of students who did not cheat but who report having been tempted to do so. We are cautious of applying deficit models of thinking in relation to this group since they ultimately chose to not act on their temptation. Nevertheless, we conceptualise these students as being at risk of cheating and thereby may provide greater understanding of the influencing factors at the tipping point of academic misconduct.

This paper explores possible correlations between temptation and four key areas that are generally assumed to reduce or impact cheating behaviour: online security systems, exam conditions (such as being open- or closed-book, location of exam, duration, and exam window), prior exam experiences (knowledge or perception of peer cheating), and student attitudes towards integrity. Analysis of the temptation data has led to new insights not readily apparent if we simply adopted a binary approach.

Logic might suggest that students who were tempted would fall in a range somewhere between those who cheated (i.e. those who succumbed to temptation), and those who were not tempted at all. This pattern was indeed observed in relation to student attitudes towards academic integrity as well as their knowledge of rules and consequences. For example, students who were tempted to cheat rated the importance of academic integrity below those who were not tempted, but higher than those who cheated. This finding seems logical, and perhaps not worth noting in its own right. It conforms to general assumptions of those who cheat as having low regard for academic integrity. However, our data adds a cautionary note to such claims because even though the cheating group was the lowest of the three groups in their rating of integrity importance, their average rating was still quite high. Therefore, our findings suggest that there is potential for integrity attitudes to be used as predictive indicators of temptation and cheating, but that the analysis is likely to only be useful when used as a comparative measure within a cohort.

The other logical pattern in which the tempted group sat between the cheated and not-tempted groups was with regards to the degree of knowledge of others cheating. Common thinking suggests that the more people are aware of cheating going on around them the more they are likely to cheat (or be tempted to cheat). We certainly saw this as a general pattern in our data. However, the significance of this finding needs to be treated with caution since the majority of students who reported being tempted or cheated had only heard rumours or nothing at all.

By focusing on the temptation group it also offers some further considerations for strategic directions. A particularly interesting finding was that proctoring was associated with less cheating, but there was no difference when we compared the conditions of automated and assisted check-in processes. However, when we moved from the binary cheating/not-cheating analysis to one which included the temptation group,

we saw a pattern which suggests the importance of social presence. It affirms that proctoring (e.g. monitoring by camera) may be more effective as a deterrent to cheating if students have had social interaction with the proctors. The nature of the interaction needs further research, whether it is an enhanced sense of being monitored, or an affirmation of an implicit social contract to act with integrity. This finding cautions automating proctoring systems without also considering how those systems can heighted perceived social presence and/or surveillance.

This study has established that there is a large group of students who do not cheat, but who are tempted to do so. It has also proposed that these students may further refine our understanding of the conditions and factors that create a tipping point for student misconduct. Future quantitative and qualitative research would be valuable in further exploring the nature of temptation, such as intensity and spontaneity, in connection with demographic, personality, as well as contextual conditions and motivations.

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