Does the timing of assessment matter? Circadian mismatch and reflective processing in university students

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University students are required to engage with new content and to be assessed at specific times of the day. Research has shown that circadian rhythms differ between individuals, with impacts on optimal functioning times. We investigate the extent to which deliberate, reflective thinking (critical for university level tasks) is impacted by the timing of tasks and the interaction of task timing with circadian rhythms. We use Cognitive Reflection Test (CRT) questions to assess students' ability to use reflective thinking. By grouping students according to their diurnal preference (morning types or evening types), we either match or mismatch the timing of the CRT assessment with diurnal preference. We find that students experiencing circadian mismatch (morning types being assessed in the evening, or evening types being assessed in the morning) perform significantly worse on the CRT, suggesting less ability to invoke reflective thinking at times of circadian mismatch. This finding suggests that timing important assessments during the day, rather than in the early morning or evening, might improve performance of mismatched students.

Keywords: assessment, cognitive reflection test, higher education, circadian mismatch

JEL codes: I23, C91, D91

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1 Introduction

University students are required to pay focused attention to lectures, to reason strategically and to complete complex assessment tasks. Both lectures and evaluations are frequently scheduled either early in the morning or in the late afternoon or evening. However, individuals differ in their circadian rhythms: the cyclic sleepiness/alertness experienced at different times of the day. Morning types, often referred to as “larks”, are naturally inclined to go to bed earlier, and to function better physically and intellectually in the mornings. Evening types (“owls”) naturally prefer to go to bed later, and function at their best in the late afternoons (Adan, et al. 2012). Circadian mismatch occurs when people have to complete tasks at times when they function less optimally. Since definitions of circadian mismatch vary, we adopt the definition of Dickinson and McElroy as “decision making at an off-peak time-of-day relative to one’s diurnal preference of mornings versus evenings” (Dickinson and McElroy 2012, 445). That is, circadian mismatch would occur when “evening” people have to perform challenging tasks in the early morning, or when “morning” people have to perform challenging tasks in the evening.

Research has suggested some negative impacts on individuals where circadian mismatch occurs, including increased reaction times (Horowitz, et al. 2003), and reduced working memory, subjective alertness and visual attention (Wright, Hull and Czeisler 2002). Cognitive resource depletion, associated with circadian mismatch, has been found to impact some thought processes more than others: automatic processes are less impacted than more controlled, strategic thinking (Dickinson and McElroy 2012, Ferreira, et al. 2006).

The timing of university lectures and assessments suggests that these impacts are likely to affect university students, who might perform worse when their lectures and evaluations take place at off-peak times relative to their diurnal preferences. The areas most impacted by circadian mismatch, particularly controlled, deliberate thinking, would be particularly important at this level.

In this study, we experimentally investigate the impact of circadian mismatch on deliberate, reflective thinking among university students. We recruited students who were either morning or evening types, based on their responses to the Morningness-Eveningness Questionnaire (MEQ) (Horne and Östberg 1976). Recruited students had to be available for both an early morning and an evening session, allowing us to randomly assign students to one of these sessions. Half of the students who signed up were randomly assigned to session times where they would experience circadian mismatch, while the other half were assigned to sessions matching their diurnal preferences. In the sessions, students answered questions modelled on the widely used Cognitive Reflection Test (CRT) (Frederick 2005) as a measure of the extent to which they were able to engage in deliberate, reflective thinking.

We found that students who experienced circadian mismatch, particularly morning types assessed in the evening, performed significantly worse on the CRT task than those who did not experience a mismatch. This finding suggests that the timing of assessments (and likely also lectures) can significantly impact students’ performance on tasks requiring this type of thinking. Avoiding early mornings and evenings for important tasks might therefore improve students’ performance.

2 Literature review

Circadian rhythm refers to an internal biological clock circle that determines the sleep and wake patterns of all mammals. Researchers have looked at chronotypes (morning or evening type) as the preferred timing of sleep in the 24-hour period. The impact these chronotypes have on the behavioural manifestation of the circadian rhythm has also been studied. Since morning types function best in the early morning, while evening types function best in the late afternoon (Adan, et al. 2012), this difference is likely to impact many areas of functioning.

2.1 Chronotype and academic performance

Traditional schedules, including school, college or working hours, are better aligned with early chronotypes' sleep times. In contrast, late chronotypes often show significant differences between working and free days' sleep times, leading to circadian mismatch during working hours. Inconsistency between social (required sleep and wake times) and biological (internal sleep and wake times) clocks can result in "social jetlag" (Wittmann, et al. 2006), where a person's sleep times differ significantly between work/school days and week-ends. These authors have noted that social jetlag increases the likelihood of consuming alcohol, caffeinated soft drinks and smoking; and might also lead to a depressed mood. Social jetlag is more common in people with late chronotype and is thought to be one cause of low academic performance (Haraszti, et al. 2014).

A number of studies have also noted the importance of sleep timing on academic performance. Among college students, the timing of sleep and wakefulness has been found to be more highly correlated with academic performance than the total amount of sleep (Eliasson, Lettieri and Eliasson 2010). Test timing has also been found to significantly impact students' performance (Clarisse, et al. 2010).

Studies have found differences between morning and evening types in academic performance. A meta-analysis found a link between better academic performance and being a morning type, but also noted that being an evening type was positively associated with cognitive ability (Preckel, et al. 2011). These authors hypothesize that the link between morning type and better academic performance is likely related to school hours being better adapted to morning types' optimal functioning times. This idea is supported by research in Turkey, where early chronotypes achieved better results than late chronotypes in a morning examination (Beşoluk, Önder and Deveci 2011), and by research in Spain, where evening-oriented adolescents performed worse at school, where early school times resulted in circadian mismatch (Escribano, et al. 2012). Further, in a recent study of scholars assigned to an afternoon school shift, no difference was found in academic performance between morning and evening types (Arrona-Palacios and Díaz-Morales 2018), supporting the idea that it might be the mismatch of school times with diurnal preference that underlies the often found weaker performance of evening types. Data from primary school children also suggest that the midpoint of sleep mediates the impact of chronotype on academic outcomes (Arbabi, et al. 2015).

2.2 Dual system theory and circadian mismatch

Other research has focused on the types of thinking most affected by cognitive depletion. Automatic thought processes have been found to be less impacted than controlled ones (Ferreira, et al. 2006). Dickinson and McElroy (2012) conducted an experiment where subjects had to show strategic reasoning for the first round of a Beauty Contest task, and simple adaptation and mimicry thereafter. Two versions of the task were presented, one of which was more cognitively simple than the other. Circadian mismatched subjects were able to complete the simpler version of the task and the more automatic adaptation and mimicry task on par with subjects not experiencing mismatch. However, the mismatched subjects performed significantly worse on the task version where higher levels of strategic reasoning were required.

The dichotomy between automatic tasks and more strategic tasks requiring conscious reasoning is reminiscent of dual system theory, where cognitive processes are either intuitive, requiring little conscious reflection; or deliberate, requiring effort, concentration and prior learning (Chaiken and Trope 1999, Epstein 1994, Sloman 1996).

Frederick (2005) developed the Cognitive Reflection Test (CRT) to test whether people were invoking the deliberate system in answering questions. The CRT questions all have an incorrect "automatic" answer, which generally comes to mind first for responders, and a correct answer requiring effort and attention. For example, Frederick's first question reads "a bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?" (Frederick 2005, 26). The impulsive, automatic answer is 10 cents. But an individual using deliberate, reflective thought will realize that this is not the correct answer: the difference between $1 and 10 cents is 90 cents, not $1. Decision makers invoking conscious reflection would therefore correct their response to 5 cents.

Given the existing findings of circadian mismatch impacting strategic decision making rather than automatic responses, we hypothesize that university students experiencing this mismatch might be more inclined to default to impulsive thinking, and less inclined to invoke the slower, more deliberate thinking that draws on prior learning. Given the need for the latter type of thinking in university level assessments, a weakened ability to think in this way would likely contribute to worse academic performance.

3 Methodology

3.1 Participants

We invited first year economics students at the University of Pretoria to participate in an economics experiment in November 2019. Interested students were directed to an online survey where they first had to confirm that they were available for both a morning (8am) and evening (7pm) time slot on the same day. This was done to avoid selection bias where students might select into a session time that better suited their diurnal preferences. The online survey also included the Morningness-Eveningness Questionnaire (MEQ) (Horne and Östberg 1976), used to diagnose students' chronotype. In the invitation, students were told that if they were invited to the experiment sessions, they would receive a show-up fee of ZAR40[1] (approximately $2.70 at the time of the experiment) and that they could also earn additional money based on the tasks they would complete in the experiment.

The MEQ comprises 19 self-report items that evaluate individuals' time-of-day preferences for sleep and physical activity leading to a rating score. Cut-offs for classifying the rating scores by chronotype are given in Horne and Östberg (1976): "Definite Evening" (score 16-30), "Moderate Evening" (score 31-41), "Intermediate" (score 42-58), "Moderate Morning" (score 59-49) and "Definite Morning" (score 70-86).

257 students indicated their interest in participating in the experiment by completing the MEQ and confirming their availability for both session times.[2] Four of these students were classified as definite evening type, 26 as moderate evening type, 37 as moderate morning type and one as definite morning type.[3] The other students were

[1] For reference, students can purchase, for example, a burger or a coffee and snack on campus for ZAR40.

[2] Students were also asked to provide some demographic details: their age, gender and whether their subjective income is above average, average, or below average compared to other UP students.

[3] While some research has found a higher prevalence of evening types among university students (Chelminski, et al. 2000), we do not find this. It is possible that some students with evening circadian

classified as intermediate according to the Horne and Östberg (1976) definitions. In order to have a useable sample size of students, we also included participants who were borderline moderate morning and borderline moderate evening types from the intermediate group: that is, we used an upper-bound of 46 to classify evening types and a lower-bound of 54 to classify morning types.

This approach allowed us to categorize 138 students as either morning or evening types, with 69 students of each type. Students in each group were randomly assigned to either the morning or the evening session[4], so that 34 evening type and 35 morning type students were invited to the evening session; and 35 evening type and 34 morning type students were invited to the morning session. 107 of these students arrived for their scheduled session on the day of the experiment. We show the breakdown of these students in Table 1. We differentiate between evening/morning type and weak evening/morning type, where the weak types are those whose scores fall in the intermediate range, but who were close to Horne and Östberg's (1976) cut-offs for the types. Table 1 shows the number of students in each group who were invited to the morning and evening sessions, as well as the number who actually participated in each session.

Table 1 – Participants inviting and attending each session, by circadian score

Type	Circadian Score	Morning Invited (n)	Morning Participant (n)	Evening Invited (n)	Evening Participant (n)
Morning	>58	19	18	19	11
Weak Morning	55 to 58	15	12	16	15
Weak Evening	42 to 46	20	17	19	15
Evening	<42	15	8	15	11

The data in Table 1 suggest that circadian mismatch might impact students' follow-through: while 18 of the 19 invited morning types arrived to the morning session, only 8 of the 15 invited evening types came to this session. We see a similar trend with the evening session, where only 11 out of the 19 invited morning types arrived, compared to 11 out of the 15 invited evening types. Students were paid a show-up fee of ZAR40 for participating in the experiment, and also earned extra money during the experiment based on their answers. Our sample is too small to draw significant conclusions from this finding, since our study was not set up to test this. The greater likelihood of deciding not to follow through on a commitment which is financially rewarding at a time of circadian mismatch might be worth exploring in future research. *It is also worth noting that the 8*

preferences might have elected not to sign up because of having to be available for both the 8am and 7pm session.

[4] Students were ranked according to the MEQ scores, then were alternately assigned to either the morning or evening session, making the matched and mismatched groups as similar as possible on MEQ score.

evening types who came to the morning session might be those who are less impacted by the morning timing of the session.

3.2 Experiment

At the University of Pretoria, classes begin at 7:30 am for most students and end at 5:30 pm. Some modules have lectures in the evening (from 5:30 pm to 8:00 pm), and students' assessments can be scheduled at any time during the day, including evenings. To match the timings of classes and assessments where students might experience circadian mismatch, the experiment was conducted at 8 am for the morning session and 7 pm for the evening session.

Students provided contact details on signing up so that we could invite students to the session to which they were randomly assigned, conditional on their availability at both session times and on their MEQ indicating (at least borderline) morning or evening chronotype. To ensure anonymity in the experiment we asked students to provide a pseudonym at sign up. During the experiment sessions, students were asked to log in using their pseudonym, allowing us to merge their MEQ score with the data from their experiment session.

During the experiment session, students were asked to report their average number of hours slept per night, as well as the number of hours they had slept the previous night. This sleep data allowed us to separate any impact of reduced sleep due to the early start time in the morning session from any impact of circadian mismatch.

In the sessions, students completed two tasks. The main task was a set of questions designed to measure engagement in deliberate, reflective thought rather than automatic processing. These questions were designed by different authors, where the goal was to create questions similar to Frederick's (2005) CRT (Primi, et al. 2016, Thomson and Oppenheimer 2016, Toplak, West and Stanovich 2014). Since Frederick's questions have now been very widely used, many people are now familiar with these questions and their answers, making it difficult to distinguish deliberate thought from familiarity with the answers.

The CRT questions were used to analyze whether students attending a session aligned with their diurnal preferences were better able to invoke deliberate, reflective thinking than those experiencing circadian mismatch. According to Frederick (2005), people who give the intuitive, but incorrect, answer to CRT questions are using their automatic response system rather than thinking through the questions and answering them using their considered, reflective system. Should this behaviour be more common among students experiencing circadian mismatch, this would suggest that students writing exams (or even attending lectures requiring significant reflective thought) during a time of circadian mismatch might be at a disadvantage.

We also included a mathematics task, where questions selected for this task were typical of those used in IQ tests such as the Wechsler Adult Intelligence Scale (WAIS-IV) (Wechsler 2008) . To simulate a timed assessment environment typical of students' assessment experience at university, a time limit of 15 minutes was given for the two tasks. A high proportion of students did not complete the second task, the mathematics test, within this time. Scores for this task would therefore confound competence at answering the questions with time management skills and response speed. For this reason we do not include this task in our analysis.

To incentivize students to pay attention to the tasks and to exert effort to answer correctly, students received ZAR1 for each question that they answered correctly, in addition to their ZAR40 show-up fee.

3.3 Estimation Approach

To investigate the impact of circadian mismatch on students' ability to engage in reflective, deliberate thinking, we estimate the following simple model using ordinary least squares with robust standard errors[5]:

$$CRTScore_i = \beta_1 + \beta_2 Mismatch_i + \gamma \boldsymbol{X}_i + \varepsilon_i$$

$Mismatch_i$ is a dummy variable taking the value of 1 if there is a mismatch between the chronotype of student i and the time of the session (morning types in the evening session or evening types in the morning session). Students are only defined as mismatched if their MEQ score would classify them as a morning or evening type according to Horne and Östberg's (1976) definitions. Students classified as borderline ("weak") morning or evening types (shown in Table 1) are considered "weakly mismatched". This would occur if borderline morning types participated in the evening session or if borderline evening types participated in the morning session. $\mathbf{X}_i$ is a vector of covariates for student i which we use as control variables. This includes the circadian type of the student (morning or evening type), the number of hours/minutes slept the night before the test, dummy variables for the family income reported by the student as below average, above average or average, and the age and gender of the student. We also control for the session attended (morning or evening session).

4 Empirical results

4.1 Descriptive statistics

We summarize the main descriptive statistics from our sample in Table 2.

Table 2 – Summary Statistics

Variable	Mean	Standard Deviation	No.
Total Score	9.92	± 5.34	107
CRT Score	3.87	± 2.06	107
Age	19.65	± 1.44	107
Overnight Sleep	6.30	± 1.76	107
Circadian Score	50.71	± 9.99	107

Recall that individuals are defined as being mismatched if their circadian score classifies them as "moderate evening" or "definite evening" when they attended the morning session, or as "moderate morning" or "definite morning" when they attended the evening session. In Table 3 we compare these mismatched respondents to all other respondents (including those who are matched i.e. attending the session corresponding to their diurnal preferences; and those who are only weakly morning or evening type). A two-tailed t-test finds a significant difference in CRT scores between those who are

[5] Since OLS regressions assume uncensored data and the CRT score can only range from 0 to 10, we conducted a Tobit regression for censored data to check the robustness of our results to this approach. Since our results are very similar, we report the OLS regressions for ease of interpretation of coefficients. The Tobit regressions are available on request.

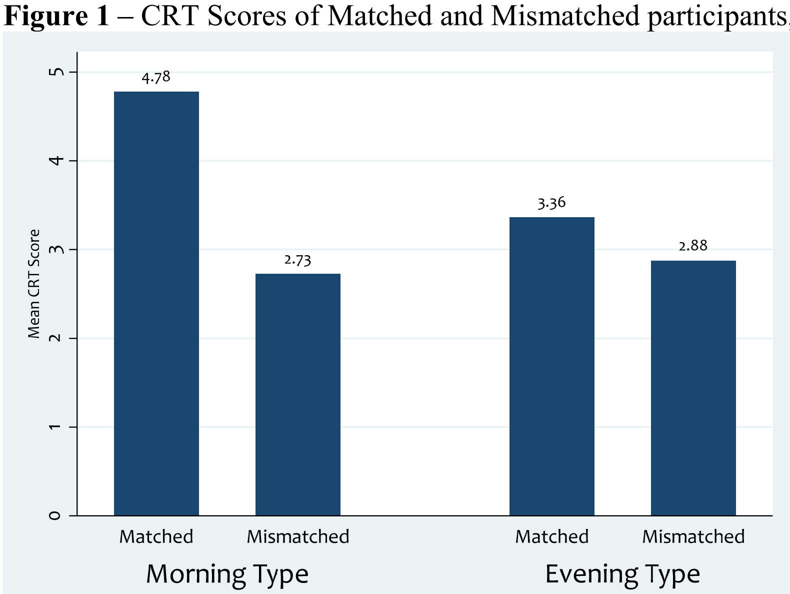
mismatched and those who are not mismatched, with mismatched students performing significantly worse on the CRT. This finding supports our hypothesis. Of note, the mismatched and not mismatched groups do not differ significantly on any of the control variables, suggesting that our randomization approach was successful.

Table 3 – Comparisons between Mismatched and Not Mismatched students

Columns by: Mismatch	Not Mismatch	Mismatch	Total	P-Value
CRT Score, mean (SD)	4.10 (1.94)	2.79 (2.32)	3.87 (2.06)	0.01
Age, mean (SD)	19.61 (1.53)	19.84 (0.96)	19.65 (1.44)	0.53
Hours slept, mean (SD)	6.39 (1.73)	5.85 (1.87)	6.30 (1.76)	0.22
Female, mean (SD)	0.53 (0.50)	0.53 (0.51)	0.53 (0.50)	0.95
Male, mean (SD)	0.44 (0.50)	0.47 (0.51)	0.45 (0.50)	0.81
Above average income, mean (SD)	0.11 (0.32)	0.05 (0.23)	0.10 (0.31)	0.43
Average income, mean (SD)	0.47 (0.50)	0.37 (0.50)	0.45 (0.50)	0.44
Below average income, mean (SD)	0.42 (0.50)	0.58 (0.51)	0.45 (0.50)	0.21
N (%)	88 (82.2)	19 (17.8)	107 (100.0)	

Figure 1 compares morning and evening type students who are matched or mismatched (that is, the borderline morning and evening students are not included here). Where morning types are considered, we note significantly lower CRT scores among mismatched students (Wilcoxon rank sum test: z=2.11, p=0.03). Where evening types are considered, the CRT score is slightly lower for mismatched students, but this difference is not statistically significant (z=0.50, p=0.61).

Figure 1 – CRT Scores of Matched and Mismatched participants, by MEQ type



4.2 Regression Analysis

To confirm that the descriptive finding of lower CRT scores among mismatched students is robust to the inclusion of a variety of control variables, we regress the CRT score on the mismatch dummy variable, adding a variety of controls. *We cluster standard errors by group (morning type in morning session, morning type in evening session, evening type in morning session, and evening type in evening session) to account for possible heteroskedasticity across these groups.* The results are shown in Table 4.

Regression (1) *in Table 4* shows that, as noted in Table 3, CRT Scores are significantly lower for students experiencing circadian mismatch. Since 10 questions were asked, this coefficient represents an average difference of 13 percentage points (*implying close to 30% reduction from the base level of about 4 correct answers on the 10 item test*) between CRT scores of students who experience this mismatch, and those who do not. Recall that we are only defining students as mismatched if they fit the Horne and Östberg (1976) definitions of morning or evening type.

In regression (2) we broaden this definition to include any students who are mismatched, adding those who were intermediate types, but were very close to either the morning or evening cut-off on the Horne and Östberg scale. We refer to this broader definition as "Weak mismatch" and note that, although weakly mismatched students do have lower CRT scores, this relationship is not statistically significant.

In regressions (3), (4) and (5) we progressively add control variables, first for morning/evening type and session time, then for the interaction between type and mismatch, and finally for hours slept and demographics. We note that the significant negative sign on the mismatch variable is robust to the inclusion of these control variables.

In regressions (4) and (5), mismatched evening types are treated separately from mismatched morning types by including an interaction dummy variable for the former group. The larger coefficient on the mismatch variable (now indicating mismatch for morning types) supports the finding in Figure 1 that it is the mismatched morning types who show significantly weaker CRT performance. The coefficient for the mismatched evening type dummy is positive and significant, but of a smaller magnitude than the mismatch coefficient. That is, mismatching for evening types predicts overall slightly lower CRT scores. Surprisingly, regressions (4) and (5) also show that respondents who reported having slept more hours performed slightly worse on the CRT.

Interestingly, we find that even after controlling for mismatch, evening types perform somewhat worse on the CRT. Some existing research has found that morning types achieve better academic results (Beşoluk, Önder and Deveci 2011, Escribano, et al. 2012). This difference has been ascribed by some researchers to the more common circadian mismatch among evening types, given the early start time of most schools (Preckel, et al. 2011, Arrona-Palacios and Díaz-Morales 2018). However, in our data the difference persists after controlling for circadian mismatch. This could support Haraszti, et al. (2014), who suggest that academic performance differences by type might relate to the "social jetlag" caused by evening types' following different sleep schedules in the week and week-end.

Table 4 – OLS Regressions: Predictors of CRT Score

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Mismatch	-1.313^{**}		-1.378^{**}	-2.308^{***}	-2.203^{***}
	(0.366)		(0.426)	(0.071)	(0.141)
Weak mismatch		-0.424			
		(0.397)			
Evening type			-0.711^{**}	-1.060^{***}	-1.052^{***}
			(0.218)	(0.024)	(0.061)
Evening session			0.153	0.636^{***}	0.590^{***}
			(0.238)	(0.084)	(0.146)
Mismatch& evening type				1.783^{***}	1.892^{***}
				(0.10)	(0.236)
Hours slept				-0.185^{***}	-0.185^{**}
				(0.043)	(0.042)
Age					-0.235
					(0.125)
Female					-0.092
					(0.367)
Above average income					1.113
					(0.678)
Average income					0.256
					(0.498)
Constant	4.102^{***}	4.071^{***}	4.378^{***}	5.507^{***}	9.937^{**}
	(0.362)	(0.230)	(0.045)	(0.252)	(2.249)
Adj. R^2	0.051	0.001	0.064	0.087	0.105
Obs	107	107	107	107	107

Standard errors in parentheses

$* \ p < 0.10, \ ** \ p < .05, \ *** \ p < .01$

5 Discussion

Circadian mismatch occurs when individuals are required to perform tasks at times that do not fit with their natural sleep/wakefulness rhythm. Research has found some indications that academic performance is hampered where students experience circadian mismatch. Reflective, deliberate thinking drawing on prior learning is essential both in mastering taught material (e.g. in following lectures on complex topics) and in performing well on assessments at the university level. We therefore investigate this type of thought as an area that might be impacted by circadian mismatch. This question is an important one, since both early morning and evening assessments and classes are common in many universities around the world, including University of Pretoria, where our study took place.

Our hypothesis was that students would perform worse on tasks requiring this type of thinking when there is a circadian mismatch. We used recent versions of the Cognitive Reflection Test originally developed by Frederick (2005) to assess reflective, deliberate thinking. As expected, students experiencing circadian mismatch performed significantly worse on the CRT than students not experiencing this mismatch. This was particularly true for morning type students who were assessed in the evening.

This finding presents a possible channel for the weaker academic performance often noted at times of circadian mismatch. It seems that students experiencing mismatch are more likely to default to more intuitive, automatic responses (which are often incorrect, as in the CRT), resulting in poorer performance on this type of task.

Given the requirement of deeper, more deliberate and effortful thought for university level tasks, this finding suggests, in line with existing research, that assessing students at times when they are not at their cognitive peak could result in their achieving worse results. Further research is needed to understand better the prevalence of morning or evening circadian type in university students, since these are the students who might suffer from circadian mismatch where class or assessment times do not match their diurnal preferences. For those students who do have a strong morning or evening preference, academic performance might be improved by considering the time of day at which key concepts are introduced, or critical assessments conducted.

As noted previously, definitions of circadian mismatch vary, with some authors arguing that morning types do not experience circadian mismatch at 7pm (Dickinson, Chaudhuri and Greenaway-McGrevy 2020). While our research focused on finding out whether students might be disadvantaged by assessment times that don't fit with their circadian preferences, our hypothesis of circadian mismatch as the biological mechanism underlying the weaker performance of morning types on evening assessments would not be robust to considering this stricter definition of mismatch. An alternative explanation could be the total time students had already been awake at the time of the assessment: students who had spent more time awake might perform worse on tasks requiring deliberate thought. Although we tracked self-reported hours slept the night before the assessment, we did not ask students to report the total time they had been awake at the time of the assessment. It is, however, likely that morning types would have, on average, been awake for longer than evening types by 7pm. Future research might investigate whether cumulative time awake might help to explain inferior performance of morning types in evening assessments.

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Declaration of interest
Conflicts of interest: none

Appendix
Comparison between morning and evening type students.

Table A1 – Comparisons between Morning and Evening type students

Columns by: morning/evening	Morning	Evening	Total	P-Value
CRT Score, mean (SD)	4.18 (2.25)	3.53 (1.79)	3.87 (2.06)	0.10
Age, mean (SD)	19.68 (1.28)	19.63 (1.61)	19.65 (1.44)	0.86
Hours slept, mean (SD)	6.33 (1.78)	6.26 (1.76)	6.30 (1.76)	0.86
Female, mean (SD)	0.52 (0.50)	0.55 (0.50)	0.53 (0.50)	0.75
Male, mean (SD)	0.46 (0.50)	0.43 (0.50)	0.45 (0.50)	0.74
Above average income, mean (SD)	0.11 (0.31)	0.10 (0.30)	0.10 (0.31)	0.88
Average income, mean (SD)	0.48 (0.50)	0.41 (0.50)	0.45 (0.50)	0.47
Below average income, mean (SD)	0.41 (0.50)	0.49 (0.50)	0.45 (0.50)	0.41
N (%)	56	51	107 (100.0)	

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