

College student study habits: Initial patterns and implications

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ABSTRACT This paper investigated whether or not there were any consistent patterns in the study habits of college students and whether or not college students studied differently than university students. Results showed that high-achieving students self-reported coming to class regularly, and they frequently used elaborative study techniques (e.g., relating readings to lecture) which have been related to better memory performance in previously published studies (Craik & Lockhart, 1972; Gurung, et al., 2010). However, these high-achieving students were still weak in their use of metacognitive skills in their studying (e.g., reviewing the questions they answered incorrectly). These results were compared to a study by Gurung et al. (2010), which used the same questions as this study to identify patterns. The comparison between university and college students is an important first step in better understanding how different types of students study and whether the effectiveness of their strategies differ. Future research should replicate this study using a larger sample of college students.

INTRODUCTION

Both students and instructors are interested in better understanding how learning works and the techniques which can be used to improve learning and/or the long-term retention of information. For students, successful learning ultimately means being able to recall information effectively during assessments, leading to higher grades and other potential benefits such as scholarships. For faculty, understanding how learning works allows for more effective delivery of content to students, resulting in a more permanent retention of course content. Consequently, being able to describe how students prepare for tests and exams (which continue to be the most common type of assessment in many disciplines) is important.

The most effective studying habits have been summarized in previous research (Gettinger & Seibert, 2002; Miyatsu, 2018; Rivers, 2020), which have proposed that students must have a vast repertoire of study strategies and the metacognitive maturity to know where, when, and how to use them appropriately. Metacognition is a key feature of students' studying and refers to being aware of and understanding one's own thinking and learning behaviours (Rivers, 2020). Students engaged in this type of reflection prior to studying significantly increased their performance (Chen et al., 2017). Furthermore, students with lower grades tended to have fewer metacognitive abilities (Coutinho, 2007; Eskandari et al., 2020; Rani & Govil, 2013). We sought to determine the extent to which students are currently using metacognition as part of their learning toolkit, specifically in preparing for tests and exams. The present research documents how a small group of high-achieving college students are currently studying.

Based on previously published studies, the process of retrieval seems to be a key aspect in long-term learning because it allows a process similar to memory consolidation to occur (Antony et al., 2017; Dunlosky et al., 2013; Larsen, 2018; Roediger & Karpicke, 2006). A student's memory of information can be greatly increased by retrieval practices, which involves repeatedly retrieving information in order to strengthen the memory (Karpicke & Roediger, 2008; Roediger & Butler, 2011). In Karpicke and Roediger's (2008) research, they looked at how different methods of repeatedly studying would affect a student's retrieval ability. They showed that when learning foreign language vocabulary, studying by re-testing oneself led to better performance compared to re-studying the material without testing. In a similar experiment, they also showed long-term retention one week later when students spent time testing themselves on the information from a passage on an unfamiliar topic (Roediger & Karpicke, 2006). These findings agree with a recent meta-analysis (Adescope et al., 2017) which demonstrated that retrieval practice leads to better retention, especially for

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students with low working memory capacity (Agarwal et al., 2016).

Some test preparation behaviours seem to predict better test performance, including memorising notes, making up examples, reading textbooks, reading class notes, using mnemonics, and taking practice tests (Adesope et al., 2017; Agarwal et al., 2017; Gurung, 2005). In previous research, taking practice tests in advance of tests or exams appeared to be one of the strongest predictors of exam performance, but was reported to be the behaviour least frequently used by students (Agarwal et al., 2017; Gurung, 2005).

Two other study behaviours that students often engage in is highlighting and re-reading course material. The effect of highlighting and re-reading material on student performance has been inconsistent in the literature (Dunlosky et al., 2013); it may lead to lower performance (Gurung et al., 2010) or an insignificant effect on student performance (Gurung, 2005). These techniques have been reported as frequently used by many students, regardless of their effectiveness (Dunlosky et al., 2013; Gurung et al., 2010).

A recent article by Gurung (2005) focused on students' studying behaviours and examined whether these behaviours enhanced or hindered their performance. Gurung noted that there is much research regarding how students ought to be preparing for exams (e.g., elaboration) but little research on how students are actually preparing. The researcher provided a survey to a class of introductory psychology students at an American university to identify the learning methods that the students in this class were using, as well as the length of time they were using each method. Gurung (2005) discovered that many of the most effective studying techniques were not the methods most commonly used by students. This study by Gurung (2005) also found that more hours spent studying did not necessarily lead to higher exam scores. The methods that appeared to work best included creating examples, reading books and notes, retrieval practice, using mnemonics, thinking of real-life examples, and self-testing (Agarwal et al., 2017; Dunlosky et al., 2013; Gurung, 2005; Miyatsu, 2018).

In a follow-up study by Gurung et al. (2010), university students most often reported attending class, organising their notes, writing down relevant numbers, and knowing assignment due dates, as study techniques used. The least frequently reported behaviours included using the textbook website for practice tests and asking for additional learning material from the instructor. Some of these study habits (e.g., answering all questions on the study guide, using practice exams, attending every class, explaining problems using the material) predicted better student performance on the final exam whereas others (e.g., looking over notes after class, highlighting important information, asking friends/classmates to re-explain material, asking the professor or TA for additional material) did not affect performance or predicted worse performance. It is also noteworthy that some of the studying behaviours that had the strongest positive correlations with final exam scores were the least frequently used by students (Gurung et al., 2010; Miyatsu et al., 2018).

College students (i.e. students who are typically pursuing a two-year credential) and university students (i.e. pursuing a four-year

undergraduate degree) are different in important ways. For example, college students are more likely to be juggling family or other responsibilities and less likely to use (or be aware of) digital success tools (Gierdowski, 2019). They are frequently less aware of their mental health issues and needs (Katz & Davison, 2014), and other social, psychological, and economic variables (Miller et al., 2004) that affect the way they learn. Additionally, different programs might lend themselves better to certain test-preparation strategies (Gurung et al., 2020). Given that colleges and universities offer different types of programs (applied versus theoretical), it stands to reason that students may be using different strategies to study. Because research on Canadian college students is rare, American data has been presented throughout this paragraph to support the claim that college and university students differ in important ways. Our research fills this important gap in the literature: describing learner characteristics of the Canadian college student. To date, no studies exist examining students' studying behaviours in Canadian colleges. College student data is infrequently solicited as most researchers primarily rely on university student samples. Many experts in the field have called for more diversified samples in research (Henrich, 2020; McCann et al., 2019). It is important to include college-level students in research because the absence of data results in (possibly) less generalizable results about how post-secondary students learn. By describing a college student sample, we can better understand how students in general prepare for assessments and perhaps be in a better position to support effective student learning in colleges. There appears to be some consistency in which study behaviours lead to better student outcomes or higher grades among university students (Chen et al., 2017; Dunlosky et al., 2013; Ekuni et al., 2020; Gettinger & Seibert, 2002; Gurung, 2005; Gurung et al., 2010; Karpicke & Roediger, 2008). It is instructive to identify which of these behaviours college students are engaging in and whether or not students are engaging in different study habits compared to university students.

The first goal of this project was to describe how Canadian college students were preparing for tests and exams and any consistent patterns arising. Additionally, we aimed to compare the study patterns of college students with those of university students, described in previously published research by Gurung et al. (2010).

METHODS

Participants

All participants were registered students in a general education course in an Ontario college. In Ontario, the term "college" is used to designate institutions of higher education that grant 1-year certificates as well as 2- and 3-year diplomas. In an introductory psychology course, we successfully recruited a small number of students ($n = 6$) to participate in an online survey. We also collected their final grades at the end of the semester. No other demographic data was collected in order to protect student privacy.

Materials and procedures

Following a consent form, students were invited to go online, outside of class time, and fill out a survey about their study habits and behaviours (Study Behavior Checklist in Gurung, et al., 2010), which they rated on a five-point scale from 1 (Not at all like me) to 5 (Exactly like me). Several areas shown to relate to student studying success were included in the checklist, including items

related to student organisation, the ability to apply material, elaborating on content, metacognitive abilities, and resource use. The 35-item questionnaire included items such as “I highlighted the most important information in each chapter to review later”, “I crammed before this exam”, and “I went to the book website for practice quizzes”. At the end of the semester, the survey responses and final grade were combined and analysed. Each student was identified by a code that preserved anonymity.

This data was used to determine the extent to which participants reported using each study behaviour. We examined the qualitative data for trends and patterns, focusing on the behaviours students reported using most and least often.

RESULTS

Due to the small sample size, the results have limited generalisability to students on a whole and should be interpreted with caution. Although many students signed the consent form to release their grades to the researchers (N = 18), only 6 students completed the associated survey in which they identified their study habits. With the exception of one outlier (which was removed from the data presented here), all students who participated in the survey were high-achieving students (>80%). The data from this outlier was omitted because their final grade in the course was more than 3 standard deviations below the mean and, therefore, was different enough from the rest of our sample to warrant its removal.

The results presented here describe student studying behaviours using the Likert scale from 1 (Not at all like me) to 5 (Exactly like me). We interpreted a score of 4 or 5 to mean that the student typically engaged in that behaviour and scores of 1 or 2 to indicate that they did not typically use that strategy to prepare for tests and exams. A summary of student responses is shown in Tables 1 & 2. The most frequently endorsed items included: “I attended every class”, “I answered every question on the study guide”, and “I evaluated the pictures/photos in the book”. Students did not report using the following behaviours very frequently: “I varied my studying behaviours by switching between reading, rehearsing, solving problems, writing, etc.”, “When I got an answer wrong on a quiz, I went back to the related material to better study it”, “I went to the textbook website for practice quizzes”, “I took the online quizzes without any notes”, “I asked (by email, a phone call, visit, etc.) the professor to explain material I did not understand”, and “I briefly reviewed all the chapters covered before I studied”. Therefore, our sample of college students self-reported engagement with the imagery in the textbooks and PowerPoint presentations, as well as class attendance. Comparatively, our college student sample used strategies involving metacognitive skills and external resources less frequently, including contacting the professor and taking practice quizzes. Given our small sample size, no quantitative statistical analyses beyond mean and standard deviation calculations were performed.

Table 1 Summary of highest-scoring items on a list of study behaviours in college students.

| Question | Mean | SD |
|---|------|------|
| I related what I was reading to lecture materials and discussion. | 4.17 | 0.84 |
| I attended every class. | 4.33 | 0.55 |
| I evaluated the pictures/photos in the book. | 4.50 | 0.89 |
| I answered every question on the study guide. | 4.67 | 0.89 |

Table 2 Summary of lowest-scoring items on a list of study behaviours in college students.

| Question | Mean | SD |
|---|------|------|
| I varied my studying behaviours by switching between reading, rehearsing, solving problems, writing, etc. | 2.00 | 1.73 |
| When I got an answer wrong on a quiz, I went back to the related material to better study it. | 2.17 | 1.34 |
| I went to the textbook website for practice quizzes. | 2.30 | 1.67 |
| I took the online quizzes without any notes. | 2.33 | 1.67 |
| I asked (by email, a phone call, visit, etc.) the professor to explain the material I did not understand. | 2.50 | 2.19 |
| I briefly reviewed all the chapters covered before I studied. | 2.50 | 1.30 |

DISCUSSION

There were notable similarities in study techniques used between the present research and the Gurung et al. (2010) investigation. The overlapping techniques included taking down and organising notes, creating examples about the material, reviewing the provided reading materials, and using a provided study guide. This seems to indicate that some techniques are more commonly used among students, regardless of institution.

Gurung et al. (2010) also presented some data that deviated from our college students' patterns (Figure 1). University students in Gurung et al.'s (2010) American sample appeared to take more notes and access additional readings more frequently than our sample of Canadian college students. Although the differences between American and Canadian students may be attributed to differences in the schooling systems in the two countries it could also be the case that students engage in different study behaviours in the two types of institutions. Our small sample of college students also appeared to prefer visual supplements (graphs, images) in the textbook compared to the previously published university data.

Metacognitive self-reflection appears to be important in successful preparation and learning, according to past research (Chen et al., 2017; Gurung et al., 2020; Rahimi & Katal, 2012; Rivers, 2020). However, our research found that high-achieving college students engaged infrequently in metacognitive study techniques. It is still undetermined whether students using metacognitive studying techniques out-perform students using other approaches to study. Future research could address the differences in metacognitive and alternative studying approaches.

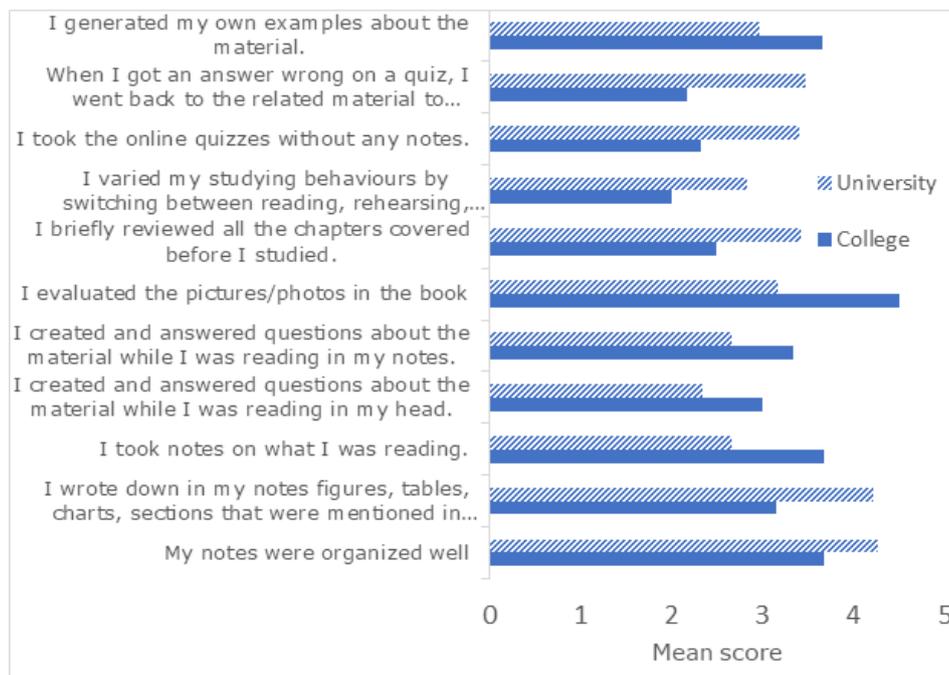


Figure 1 Comparison of university and college students' studying behaviours. Note: the university data was taken from Gurung et al. (2010) and the college data is original.

One major limitation to our study was the small sample size. All of our participants were high-achieving students, which means that they may not be representative of the college student population as a whole. Consequently, although the reported patterns are interesting, they should be interpreted with caution. It is encouraging that, in a quasi-replication, Redd & Kennette (2020) found similar patterns using a larger sample, which seems to suggest that the summary data reported herein is at least adequately representative of the larger college population. What can be concluded from these results is that the high-achieving college students in our sample appear to use similar study strategies as the much larger Gurung et al. (2010) sample of university students.

This research serves as an important initial step to identifying which study habits (high-achieving) students at a college are engaging in. Although we had anticipated correlating study habits to classroom performance, our small sample size prevented us from doing so. We would expect to find that students who frequently employ study habits that lead to deeper processing would perform better on assessments. However, this relationship has yet to be examined in college classrooms. As previously noted, there exist far fewer research studies of college students compared to university students. As such, this research is an important first step in understanding this subset of the student population better. A related shortcoming is that most samples tend to be WEIRD: Western, Educated, Industrialized, Rich, and Democratic (Henrich, 2020; Henrich et al., 2010). Future examinations of college students' studying behaviours should include a diverse sample and ensure that the sample includes students across a range of academic performance levels, not only high-achieving students. Additionally, future studies should replicate this methodology with a more diverse and larger sample population, and include grade data to examine whether the most used techniques are actually effective or whether the more under-utilised approaches to studying could be more predictive of learning.

We also recommend that faculty members inquire about the study habits of their students and ask students to complete the Study Behavior Checklist (Gurung et al., 2010) to open a discussion about the efficacy of students' learning. Simply completing the inventory could even inspire students to try new approaches to test preparation or to seek out expert guidance from faculty.

CONCLUSIONS

The methods that students use to prepare for tests and exams may not always be effective. The high-achieving students examined here did not engage in high levels of metacognition during their studying. This paper makes an important contribution in that it examined the study habits of college students, information which is not currently available elsewhere. Comparing the study habits of university and college students can help us to better understand the effectiveness of these study strategies and inform models of learning and memory.

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