Insidious Assumptions: How Pluralistic Ignorance of Studying Behavior Relates to Exam
Performance

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Abstract

Pluralistic ignorance occurs when individuals misperceive a group norm and attempt to match the perceived – rather than actual – norm. Little is currently known about its role in the undergraduate classroom. The present research examined the pluralistic ignorance of studying behavior and its relationship with examination performance across four studies. Results suggested that students underestimate peers' amount of studying (Study 1) and that the extent of their estimation error is related to exam performance (Study 2); a relationship that is fully mediated by a perceived lack of preparation (Study 3). Finally, a brief classroom intervention (Study 4) may be able to eliminate the pluralistic ignorance. Implications for the theory of pluralistic ignorance, and college teaching, are discussed.

Keywords: teaching, studying, examination, pluralistic ignorance

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Peers are a critical source of information for undergraduate students, as perceptions of others' actions and beliefs can drive certain behavioral tendencies. Research on behaviors as varied as alcohol consumption, smoking, cheating, and "hooking up" suggests that college students' assumptions about their peers' conduct are often faulty and unduly influence behavior in detrimental ways (e.g., Lambert, Kahn, & Apple, 2003). Such "pluralistic ignorance" occurs when individuals misperceive group norms, or privately reject group norms but believe that other group members accept them, and change their attitudes or behaviors to more closely resemble the perceived norm (Allport, 1924; Katz & Allport, 1931). In this article, we examine the extent to which college students experience pluralistic ignorance of studying norms and, if so, how it is related to academic performance.

There is growing evidence to suggest that on the whole, college students are spending less time studying (McCormick, 2011; Pryor, Hurtado, Saenz, Santos, & Korn, 2007). Though there is some debate as to whether study hours are the best indicator of learning (Credé, Roch, & Kieszczynka, 2010; Gurung, 2002; Krohn & O'Connor, 2005), studying behavior does predict academic performance and thus is a worthy target of empirical study (Heikkilä & Lonka, 2006; Patterson, 2017). There are a host of different possible explanations for reduced out-of-class study time, including increased vocational or volunteer commitments (Gose, 1998) as well as technology-related distractions (Mokhtari, Reichard, & Gardner, 2009).

Another possible explanation for reduced student study behaviors involves the perception of peers' study habits. This hypothesis is rooted in the tenets of pluralistic ignorance (Allport, 1924; Katz & Allport, 1931), a social phenomenon that can occur in situations in which there is

not a clear or standardized behavioral norm. Pluralistic ignorance theory describes four components. First, group members perceive some norm, and privately reject the perceived norm, but believe that other group members accept it. Second, in order to avoid negative social consequences, individuals change their expressed attitude or behavior to adhere to the perceived group norm. Third, individuals believe that others are acting in consonance with their personal attitudes; it is this differential attribution that results in pluralistic ignorance (Miller & McFarland, 1987). Fourth, individuals' beliefs and subsequent behaviors are malleable in response to corrections of the perceived group norm (Schroeder & Prentice, 1998).

Among college students, pluralistic ignorance has been most extensively studied in the context of alcohol use. Research shows that individuals' perceived peer alcohol use predicts their own drinking behavior (Prentice & Miller, 1993; Schroeder & Prentice, 1998) and that these perceptions function as injunctive norms that encourage binge drinking (Perkins & Berkowitz, 1986). According to pluralistic ignorance theory, this is the result of college students believing that the average student (Perkins & Berkowitz, 1986), and even their own friends (Prentice & Miller, 1993), are more comfortable than they are with binge drinking behaviors.

Although pluralistic ignorance has been primarily studied with regard to health behaviors and general attitudes, it may also play a role in academics. The one study to date examining pluralistic ignorance in the classroom focused on cheating and the study's findings suggested that students perceived there to be significantly more cheating than was actually occurring (Curtis, Roberts, Mitchell, & Seiler, 2012). Some cheating behaviors were overestimated by as much as five times their actual prevalence, suggesting that misperceptions about peer behavior similarly exists in the college classroom. Beyond cheating behaviors, it is plausible that perceptions of peers' academic efforts are misconstrued, creating injunctive norms about broader

academic strategies as well. To study less than one's peers may invite negative perceptions of laziness, whereas studying more than one's peers and incurring the perception of being overly bookish might be similarly aversive. In either direction, departure from the norm may result in expected embarrassment, motivating conformity with the misperceived norm of study time and effort.

The current set of studies explores pluralistic ignorance of studying behavior, by examining students' perceptions of the time that their peers spend studying for an exam. Additional analyses were conducted to understand the associations that exist between the pluralistic ignorance of studying behavior, one's own time spent studying, and the outcome variable of exam performance. We first examined students' self-reported study time (to establish the norm) and then their estimate of peers' study time, in order to establish that pluralistic ignorance exists in this area (study 1). Building on this, we linked pluralistic ignorance of studying to actual exam performance (study 2), a relevant outcome variable. Further, we found that the relationship between pluralistic ignorance of studying and exam performance is fully mediated by students' sense of relative preparation for the exam (study 3). Finally, we explored whether a brief, study time norm-correcting intervention could influence pluralistic ignorance of studying, and its relationship with exam performance (study 4).

Study 1

Hypotheses

To assess for pluralistic ignorance of studying behavior, we had students report how long they spent studying for an exam, as well as their estimate of how long their fellow students studied for the exam. We made two predictions based on pluralistic ignorance theory. First, that

students would underestimate how long other students studied, and second, that their perception of other students' study time would be positively correlated with their own time spent studying.

Method

One hundred twenty undergraduates enrolled in an introductory social psychology course in the fall of 2014 were presented with the opportunity to participate in this study precisely 5 minutes before the first examination of that semester. Students were informed that those who choose to not participate should sit quietly or continue preparing for the exam, whereas those who choose to participate should retrieve their cellular phones in order to complete the study. One-hundred students chose to participate. After dropping one participant for selecting the, "I do not consent" option on the online consent form, we were left with a total sample size of 99 participants.

The study was completed through Poll Everywhere, a mobile-based classroom response system. After participants provided informed consent, they submitted responses to two questions. The first question ("How many hours did you prepare for this examination?") served to establish the mean study time. The second question, ("How many hours did the average student in this class prepare for this examination?") measured students' perception of the study time norm. Similar to prior work (e.g., Prentice & Miller, 1993) we operationalized pluralistic ignorance as a significance difference between the means of the two questions.

Results

As Figure 1 displays, students reported preparing for an average of 6.68 hours ($SD = 3.62$), whereas they estimated that their fellow students had prepared for 5.13 hours ($SD = 3.27$). The difference between self-reported study time and the perceived study time norm was significant, $t(98) = 3.69$, $p < .01$, Cohen's $d = 0.39$, 95% CI [0.71, 3.67]. Additionally, students'

own study time was positively correlated with their estimates of the study time of others, $r(97) = .27, p < .01$.

Brief Discussion

Study 1's results were consistent with two central tenets of pluralistic ignorance theory. Students incorrectly perceived the norm of others' studying behavior, and this incorrect perception was associated with their own study behavior. Specifically, students underestimated the mean study time (operationalized as self-reported study time) for the average student in class, and there was a positive correlation between students' perception of others' study time and their own time spent studying. While Study 1 provides initial support for a pluralistic ignorance account, it did not address the implications of the pluralistic ignorance. For instance, are student misperceptions of studying norms associated with any important outcome variables, such as exam performance?

Study 2

Hypotheses

In order to replicate and extend the findings of study 1, study 2 utilized a similar research design while including students' exam performance. This was done in order to investigate the potential association between pluralistic ignorance of studying and an important outcome variable, exam performance. A pluralistic ignorance framework suggests that students who underestimate the study time norm would study less, and those who overestimate the norm would study more, in order to meet the perceived norm. As studying time is associated with exam performance (Heikkilä & Lonka, 2006), we predicted a positive relationship between the extent of pluralistic ignorance and exam performance. In other words, we predicted that

underestimating the study time norm would be associated with poorer exam performance whereas overestimating it would be associated with better performance.

Method

One hundred fourteen undergraduates enrolled in an introductory social psychology course in the spring of 2015 were presented with the opportunity to participate in this study precisely 5 minutes before the first examination of that semester. As in study 1, students were then instructed to sit quietly if they chose to not participate and to retrieve their cellular phones if they chose to participate. A sample of 94 students volunteered. After providing informed consent, participants responded to the same items as were used in study 1. Exam scores were later matched to each participant.

In order to investigate the relationship between pluralistic ignorance of study time and exam performance, we calculated the extent of participants' pluralistic ignorance. Pluralistic ignorance scores were operationally defined as the difference between each participant's estimate of the typical student's study time (i.e., each participant's perception of the study time norm) and the mean of all participants' self-reported study time (i.e., the norm). A score of zero therefore represented an accurate perception of the study time norm, positive values represented an overestimation of the norm, and negative values represented an underestimation of the norm.

Results

Pluralistic Ignorance. Students reported studying for 8.52 hours ($SD = 4.92$) on average, whereas they believed that their fellow students had studied for 7.84 hours ($SD = 3.52$). This difference was marginally significant, $t(93) = -1.87$, $p = .06$, Cohen's $d = 0.19$, 95% CI [-1.40, 3.08]. As in study 1, participants' own reported study time was significantly correlated with their perceptions of others' study time, $r(92) = .63$, $p < .01$.

Exam Performance. Multiple linear regression was used to examine the effect of extent of pluralistic ignorance and students' self-reported study time on exam performance, with both predictor variables entered simultaneously into the model. The model significantly predicted exam performance, $F(2, 91) = 4.88, p < .01, R^2 = .10$. Higher pluralistic ignorance scores (meaning greater overestimation of the study time norm) were associated with lower exam scores, $B = -2.00, SE = 0.65, p < .01$. Students' reported study time was not associated with exam performance, $B = 0.77, SE = 0.46, p = .10$.

Brief Discussion

The results of study 2 similarly aligned with a pluralistic ignorance framework by demonstrating a misperception of the group study time norm, as well as a positive correlation between the estimate of the norm and the amount of time that students reported studying. The observed relationship between the extent of pluralistic ignorance of studying and exam performance, however, was unexpected. We predicted a positive relationship. Counter to this prediction, we found a negative relationship wherein overestimations of the study time norm were associated with lower exam scores and underestimations associated with higher exam scores. This counterintuitive (and counter-prediction) finding highlights the complexity of the factors that jointly influence students' exam performance, and suggests that one or more unexplored variables need to be considered in order to better understand this phenomenon.

Two such variables, students' feeling of being prepared for the exam and predictions about the exam's difficulty, may help to shed light on the current findings. Estimations of the study time norm may be related to feelings of exam preparedness through basic social comparison processes. Students that overestimate the study time norm may make frequent upward social comparisons, leading them to feel relatively underprepared despite how many

hours that they actually study. The perception that one is unprepared may result in interfering cognitions during the exam, such as self-doubt and anxiety, leading to lower scores. Students that underestimate the study time norm may make frequent downward social comparisons, leading them to feel relatively prepared and self-assured, promoting higher exam scores. Alternatively, students may be basing their estimates of the study time norm on their predictions about the difficulty of the exam. Those who believe that an exam will be particularly difficult, and therefore anticipate that they and others will struggle to perform well on it, may estimate that others studied extensively in order to be best prepared for it. We examined the role of these variables in the pluralistic ignorance of studying and exam performance relationship in study 3.

Study 3

Hypotheses

To clarify the unexpected findings from study 2, we conducted a third study. Our aim in study 3 was to replicate the findings from study 2 and also collect additional data on students' perceived level of preparation and predictions of exam difficulty. We hypothesized that students' perceived preparation would mediate the relationship between pluralistic ignorance of study time and exam performance. Alternatively, we predicted that predictions of exam difficulty would serve as a third variable, potentially associated with both pluralistic ignorance of study time and exam performance.

Method

One hundred nineteen undergraduates enrolled in an introductory social psychology course in the fall of 2015 were presented with the opportunity to participate in this study precisely 5 minutes before the first examination of that semester. As in prior studies, students

were then instructed to sit quietly if they chose to not participate and to retrieve their cellular phones if they chose to participate. A sample of 88 students volunteered.

Participants first completed an online consent form and then responded to the same items from studies 1 and 2 regarding their own study time, and their estimate of other students' study time. In addition to those items, participants responded to questions about their exam preparation on a scale of 0 (*no preparation*) to 100 (*ideal or best state of preparation possible*). Using this scale, participants indicated how prepared they thought they were; how prepared they felt they needed to be to do well; how prepared they thought the average student was; how prepared they thought the average student needed to be to do well.¹ We operationally defined participants' perceived lack of preparedness as the difference between the level of preparation they reported needing to do well and the level of preparation they felt that they had achieved. Higher scores thus indicated a greater perceived lack of preparedness. We operationally defined predicted exam difficulty as the level of preparation students felt they needed to do well.

Results

Pluralistic Ignorance. Students reported preparing for 7.26 hours ($SD = 3.27$) on average, and they estimated that their fellow students prepared for 6.43 hours ($SD = 3.28$). This difference was significant, $t(87) = -2.31, p = .02$, once again demonstrating pluralistic ignorance in perception of study time. As in studies 1 and 2, perceptions of others' study time were significantly and positively correlated with ones' own study time, $r(86) = .49, p < 0.01$.

Exam Performance. Multiple linear regression was used to examine the effect of pluralistic ignorance of study time and students' reported study time on exam performance. As in Study 2, both variables were entered simultaneously into the model. The model significantly

¹ The final two items were not used in any analyses, and were included to bolster the cover story that the experiment was about one's experiences in college as well as their thoughts about their classmates' experiences.

predicted exam performance, $F(2, 85) = 4.06, p = .02, R^2 = 0.09$. As in study 2, higher levels of pluralistic ignorance (i.e., greater overestimation of the study time norm) were associated with lower exam scores, $B = -2.34, SE = 0.84, p < .01$. Students' reported study time was marginally associated with exam performance, $B = 1.36, SE = 0.74, p = .07$.

Mediation by Perceived Lack of Preparation. The INDIRECT macro (Preacher & Hayes, 2008) was used in SAS to examine whether students' perceived lack of preparation mediated the relationship between pluralistic ignorance of study time and exam performance. INDIRECT uses bootstrapped confidence intervals to test each step of a hypothesized mediation model for significance. As hypothesized, higher levels of pluralistic ignorance of study time (i.e., overestimations) were associated with greater lack of preparation ($B = 1.48, SE = 0.50, p = .004$), and greater perceived lack of preparation was associated with lower exam performance ($B = -0.38, SE = 0.16, p = .02$). The total effect of pluralistic ignorance of study time on exam performance was significant ($B = -1.58, SE = 0.75, p = .04$), but when perceived lack of preparation was accounted for the relationship was no longer significant ($B = -1.02, SE = 0.77, p = .19$). In other words, students who overestimated the study time norm also felt less prepared for the exam, and those who felt less prepared for the exam also performed more poorly on the exam. See Figure 2.

Prediction of Exam Difficulty. To examine the third-variable prediction that estimates of exam difficulty would be related to both pluralistic ignorance and exam performance, we first calculated bivariate correlations. Predicted exam difficulty was correlated with the pluralistic ignorance of study time, $r(85) = .27, p = .01$ but not with exam performance, $r(85) = -.06, p = .60$. To probe the predicted exam difficulty and pluralistic ignorance of study time relationship further, we next conducted a multiple linear regression using predicted exam difficulty and self-

reported study time as predictor variables and estimate of others' study time as the outcome variable. The overall model was significant, $F(2, 84) = 14.56, p < .01$, but only participants' own study time was significantly associated with the estimate of other's study time, $B = 0.40, SE = 0.09, p < .01$. Predicted exam difficulty was not, $B = 0.04, SE = 0.03, p = .12$.

Brief Discussion

Study 3 replicated the pluralistic ignorance of study time finding from studies 1 and 2. It also replicated the relationship between pluralistic ignorance of study time and exam performance found in study 2. It furthered these findings by examining two explanations for the negative relationship between pluralistic ignorance of study time and exam performance: mediation by perceived lack of preparation for the exam, and the third variable explanation of predicted exam difficulty. The data best supported a mediation model in which the extent of pluralistic ignorance of the study time norm was related to feeling unprepared for the exam and feeling unprepared was related to exam performance. In other words, individuals who overestimated the study time norm felt less prepared for the exam and also received lower exam scores. Individuals who underestimated the study time norm felt more prepared for the exam and also received higher exam scores. We found no support for an association with predicted exam difficulty.

These findings are consistent with a pluralistic ignorance account; students reported inaccurate perceptions of the study time norm and those perceptions were related to a corresponding behavior, their own study time. We also found that pluralistic ignorance in the study domain predicted later exam performance. As estimations of the study time norm increased so did feelings of being unprepared for the exam. Feeling underprepared for the exam was

associated with poorer exam performance. We have postulated that this was due to the presence of interfering cognitions, such as self-doubt and anxiety.

Luckily, research suggests that pluralistic ignorance effects can be remedied by informing participants of the actual mean (Schroeder & Prentice, 1998). If our findings can be explained by pluralistic ignorance, participants informed of the actual study time mean should no longer misjudge the studying behavior of others, and any misjudgments that do occur should no longer be systematically linked to exam performance. To begin to test this idea, we next conducted an investigation of how a norm-correcting intervention might influence pluralistic ignorance of study time, and its relationship with exam performance.

Study 4

Hypotheses

Study 4 was a preliminary investigation of educating students about peer study behavior. Specifically, we predicted that sharing the class's mean study time for the first exam one-week prior to the second exam would dispel pluralistic ignorance of study time, and eliminate the relationship between estimates of others' study time and exam performance.

Method

The same 119 social psychology students from study 3 were given the opportunity to participate in study 4. The first part of study 4 took place one week prior to the second exam of that semester. We used the data from study 3 to inform students of their classmates' mean study time for the first exam. We did not provide any additional information (e.g., on the theory of pluralistic ignorance) at that time. The second part of study 4 took place one week later, five minutes before the second exam. As in prior studies, students were then instructed to sit quietly if they chose to not participate and to retrieve their cellular phones if they chose to participate. A

final sample of 103 students volunteered. At that time, participants completed the same measures as were used in study 3.

Results

Pluralistic Ignorance. One week after being exposed to the norm-correcting intervention (and just prior to exam 2), students reported preparing for 7.16 hours ($SD = 4.42$) on average, and they estimated that their fellow students had prepared for 7.24 hours ($SD = 3.64$). There was no significant difference between actual and estimated studying, $t(102) = 0.24, p > .05$, Cohen's $d = 0.02$, 95% CI [-0.63, 3.20]. Students' own study time remained positively correlated with their estimates of the study time of others, $r(101) = .66, p < .01$.

Exam Performance. Multiple linear regression was used to examine the effect of pluralistic ignorance, study time, and perceived lack of preparation on exam performance.² The model significantly predicted exam performance, $F(3,100) = 4.20, p = .007$. However, perceived lack of preparation was the only variable that demonstrated a significant association, $B = -0.39, SE = 0.11, p = .001$; neither pluralistic ignorance nor students' reported study time were related to exam performance. Replication of the mediational analysis used in study 3 confirmed that pluralistic ignorance was not significantly associated with feelings of preparedness, $B = 0.25, SE = 0.46, p = .58$.

A paired samples t-test, using the 103 students that consented to participate in study 4, revealed that participants received a score, on average, 3.4 points higher on the second exam ($M = 168.74, SD = 19.64$) than on the first exam ($M = 164.88, SD = 21.54$), a significant difference $t(102) = -2.07, p = .04$, Cohen's $d = 0.21$, 95% CI [-6.93,16.52]. In order to provide some evidence that this exam performance difference was not simply due to practice effects or

² Including exam 1 performance as an additional predictor does not change the directionality or significance of any result.

maturation, we conducted a paired sample t-test on exam 1 and exam 2 scores from the prior semester (spring 2015).³ In this context, exam 2 performance ($M = 165.18$, $SD = 18.90$) was not significantly different than exam 1 performance ($M = 163.74$, $SD = 19.41$), $t(114) = -0.99$, $p = .32$.

Brief Discussion

One week after a study time norm-correcting intervention, students did not demonstrate the pluralistic ignorance of studying observed in studies 1-3. Additionally, the relationship between pluralistic ignorance of studying and exam performance observed in studies 2 and 3 was no longer significant, nor was the relationship between pluralistic ignorance of studying and perceived lack of preparation observed in study 3. It is possible that informing students of the class's actual mean study time helped them to adjust their studying behavior in the week preceding exam 2, resulting in these changes. Unfortunately, the major limitation of study 4's descriptive research design is that we cannot make such causal conclusions. It is also possible that maturation or practice effects may have caused these results. The fact that there was no similar increase in performance on exam 2 in the same course during the prior semester provided some empirical evidence against the maturation or practice effects explanation, but more research on a possible pluralistic ignorance intervention is still needed. A study experimentally manipulating the presence or absence of a norm-correcting intervention prior to an exam would be a particularly beneficial next step for this line of research.

General Discussion

³ Exam items were not changed between the spring 2015 and fall 2015 semesters. Independent samples t-tests demonstrated no significant score increase on either exam 1 (spring 2015 $M = 163.74$, $SD = 19.41$, fall 2015 $M = 164.00$, $SD = 21.51$, $t(114) = 0.09$, $p = .93$) or exam 2 (spring 2015 $M = 165.18$, $SD = 18.90$, fall 2015 $M = 168.34$, $SD = 19.53$, $t(111) = 1.24$, $p = .22$), indicating that student sharing of exams items between semesters was minimal and unlikely to impact performance (an additional protection against this form of cheating was that the course instructor only allowed students to review exam items in class, or during office hours).

Prior research has found that pluralistic ignorance, a misperception of the prevailing norm, has resulted in increased cheating, drinking, and sexual behavior (Curtis, Roberts, Mitchell, & Seiler, 2012; Prentice and Miller, 1993; Lambert, Kahn, & Apple, 2003). Our research extends these findings into another important domain: studying for exams. Across four studies, we provided evidence for a pluralistic ignorance of studying: students underestimated the amount of time that their peers prepared for an exam (studies 1, 2, 3), pluralistic ignorance of study time was associated with an important outcome variable, exam performance (studies 2, 3), the relationship between pluralistic ignorance of studying and exam performance was fully mediated through a perceived lack of preparedness (study 3), and finally a brief norm-correcting intervention may be associated with an elimination of pluralistic ignorance (study 4).

In investigations of pluralistic ignorance, the direction of ignorance typically predicts the corresponding maladaptive behavior. For instance, Prentice & Miller (1993) found that students overestimated their peers' alcohol consumption and the extent to which their peers personally endorsed binge drinking. This misperception led students to drink more in order to approach the norm they perceived. One might reasonably expect, then, that if students underestimate the time that their peers spend preparing for an exam they would down-regulate their own studying and, as a consequence, perform worse on the exam. Our research supported only two-thirds of this prediction. We consistently found pluralistic ignorance of study time (a misperception of the norm), and a positive relationship between the perception of the norm and students' own study time. Contrary to our expectations, we found a negative rather than positive relationship between pluralistic ignorance of study time and exam performance. In other words, as students' estimations of the study time norm increased, their exam scores decreased.

We believe that these findings are due to the same social comparison processes that give rise to many pluralistic ignorance effects. In this context, students may have utilized their perception of their peers' preparation as the standard by which they judged their own preparation for the upcoming exam. If this is the case then students who perceived peers as studying relatively few hours (a downward social comparison) should feel that they themselves are well-prepared to perform well on the exam, and students who perceived peers as studying a great amount (an upward social comparison) should feel relatively less prepared to perform well on it. This line of reasoning is supported by the results of study 3, particularly by the finding that perceived lack of preparedness fully mediated the pluralistic ignorance of study time and exam performance relationship. We have argued that this sense of being unprepared may have been accompanied by performance inhibiting cognitions during the exam, such as self-doubt or anxiety.

Due to the correlational nature of research, we cannot conclusively show that misperceiving the study time norm (i.e., pluralistic ignorance of study time) causes changes in feelings of preparedness or in exam performance, nor that the norm-correcting intervention caused the pluralistic ignorance to abate. Further, although we did find the pattern of pluralistic ignorance to be rather consistent across three semesters, all data was collected within a single instructor's introductory-level social psychology course (before students learned about pluralistic ignorance). It will be important to replicate these finding across other disciplines and course levels and to add contextual moderators to the presence and effect of pluralistic ignorance on performance. For example, we might expect to find greater pluralistic ignorance in courses where rote memorization is a dominant strategy or in courses where students feel more deindividuated (i.e., larger and lecture-based). Finally, future research must more fully test

whether correcting misperceptions of a norm causes a decrease in pluralistic ignorance and a change in corresponding behaviors, as pluralistic ignorance theory would predict. To do so, researchers would need to experimentally manipulate student perceptions prior to the first exam of a semester, ideally with participants receiving either no information or an inflated, accurate, or underestimated mean. A more powerful analysis of exam performance will also need to include covariates (e.g., overall GPA) that we were not able to collect in this series of studies.

Summary and Conclusions

In all, we have demonstrated that students experience pluralistic ignorance of studying time, that pluralistic ignorance of study time is related to exam performance, that the pluralistic ignorance and exam performance relationship is mediated by feeling unprepared, and that a simple norm-correcting intervention may eliminate this phenomenon. There could be significant positive effects from facilitating an active discussion with classes on effective study behaviors, and within that context, from correcting potentially detrimental misperceptions. Unless we as educators actively intervene, our students will approach their coursework from a platform built upon flawed perceptions of the classroom norm, and those most at risk may suffer the most from their shared ignorance.

References

- Allen, V. (1965). Situational factors in conformity. *Advances in Experimental Social Psychology*, 2, 133-170.
- Allport, F. H. (1924). *Social psychology*. Boston: Houghton Mifflin.
- Credé, M., Roch, S. G., & Kieszczynka, U. M. (2010). Class attendance in college a meta-analytic review of the relationship of class attendance with grades and student characteristics. *Review of Educational Research*, 80, 272-295. doi: 10.3102/0034654310362998
- Gurung, R. A. (2005). How do students really study (and does it matter)? *Education*, 39, 323-340.
- Heikkilä, A., & Lonka, K. (2006). Studying in higher education: Students' approaches to learning, self-regulation, and cognitive strategies. *Studies in Higher Education*, 31(1), 99-117. doi: 10.1080/03075070500392433
- Katz, D., & Allport, F. H. (1931). *Student attitudes: A report of the Syracuse University Research Study*. Syracuse, NY: Craftsman Press.
- Krohn, G. A., & O'Connor, C. M. (2005). Student effort and performance over the semester. *The Journal of Economic Education*, 36, 3-28. doi: 10.3200/JECE.36.1.3-28
- Lambert, T. A., Kahn, A. S., & Apple, K. J. (2003). Pluralistic ignorance and hooking up. *Journal of Sex Research*, 40, 129-133. doi: 10.1080/00224490309552174
- McCormick, A. C. (2011). It's about time: What to make of reported declines in how much college students study. *Liberal Education*, 97, 30-39.

- Miller, D. T., & McFarland, C. (1987). Pluralistic ignorance: When similarity is interpreted a dissimilarity. *Journal of Personality and Social Psychology*, 53, 298–305.
doi:10.1037/0022-3514.53.2.298
- Mokhtari, K., Reichard, C. A., & Gardner, A. (2009). The impact of internet and television use on the reading habits and practices of college students. *Journal of Adolescent & Adult Literacy*, 52, 609-619. doi: 10.1598/JAAL.52.7.6
- Patterson, M. C. (2017). A naturalistic investigation of media multitasking while studying and the effects on exam performance. *Teaching of Psychology*, 44, 51-57.
- Perkins, H. W., & Berkowitz, A. D. (1986). Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. *Substance Use & Misuse*, 21(9-10), 961–976. doi:10.3109/10826088609077249
- Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology*, 64, 243–256. doi:10.1037/0022-3514.64.2.243
- Pryor, J. H., Hurtado, S., Saenz, V. B., Santos, J. L., & Korn, W. S. (2007). *The American freshman: Forty year trends*. Los Angeles: Higher Education Research Institute.
- Schroeder, C. M., & Prentice, D. A. (1998). Exposing pluralistic ignorance to reduce alcohol use among college students. *Journal of Applied Social Psychology*, 28, 2150–2180.
doi:10.1111/j.1559-1816.1998.tb01365.x

Figure 1. Pluralistic ignorance of study time effects across studies.

Note. $*$ = $p < 0.05$. $**$ = $p < 0.01$.

Figure 2. Study 3 mediation analysis.⁴

⁴ C' represents the direct effect of pluralistic ignorance on exam performance only, while c indicates the total effect of pluralistic ignorance on exam performance (the direct effect represented by c' added to the indirect effect through b).