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Cell phone use policies in the college classroom: Do they work?

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Abstract: *Our study examined the efficacy of lenient and restrictive cell phone policies. We expected that a lenient policy would be associated with lower quiz scores, greater anxiety, and lower GPA. Additionally, we expected students to self-report using their phones mostly for non-academic purposes. We gave one introductory psychology section a restrictive cell phone use policy while another section was given a lenient policy. We observed how often students used their phones during class in both conditions. At the end of the class period, students took a short quiz over the lecture material. Afterward, they were given a survey that measured demographics, attitudes about cell phone use in class, academic motivation, cell phone use domains, and anxiety. In the restrictive policy condition, students used their cell phones in class at a similar rate as in the lenient policy condition, suggesting that the restrictive cell phone policy was ineffective. Students operated their phones an average of about seven times during the 50-minute class period, mostly for non-academic purposes. Our results contribute to a body of literature showing that electronic devices distract students and decrease the efficacy of the learning environment.*

Cell phone use policies in the college classroom: Do they work?

Examining the relationship between cell phone use and the learning environment is critical in understanding contemporary college students. Most students report bringing their cell phones to class every day (Froese, Carpenter, Inman, Schooley, Barnes, Brecht, & Chacon, 2012), and over 80% report using their phones at least one time in each class period (Berry & Westfall, 2015). Smartphones give students endless academic resources at their fingertips. While cell phones allow students to quickly access information, they also introduce potentially negative effects on teaching and learning (Burns & Lohenry, 2010). Classroom cell phone policies might help to mitigate negative effects of cell phones on student achievement (Burns and Lohenry, 2010). Our study examines the efficacy of restrictive and lenient policies.

Many studies show that in-class cell phone use has predominantly harmful effects on student learning (Bjornsen & Archer, 2015; Burns & Lohenry, 2010; Duncan, Hoekstra, & Wilcox, 2012; Froese et al., 2012; Junco & Cotten, 2012; Lepp, Barkley, & Karpinski, 2014). Using interviews, observations, and surveys, Duncan et al. (2012) found that the use of cell phones in class corresponded to a decline of nearly half of a letter grade in the course. Similarly, Froese et al. (2012) found that texting in class was associated with a 27% drop in student grades. A recent meta-analysis on a range of student outcome variables showed a negative relationship between cell phone use and student achievement (Kates, Wu, & Coryn, 2018). Classroom cell phone use and its associated negative outcomes may be particularly likely in some learning environments (e.g., high enrollment classes with little active student participation; Berry & Westfall, 2015).

Some authors have argued that classroom cell phone use can be beneficial if it is integrated into course activities (Wood, Mirza, & Shaw, 2018). For example, phone-based personal response systems (e.g., Kahoot, TopHat) have been shown to have positive effects on learning (Ma, Steger, Doolittle, & Stewart, 2018). However, college students report spending the majority of time using cell phones for non-academic purposes (Junco & Cotten, 2012), and "off-task" uses are common during classroom activities that integrate cell phones (Wood, et al., 2018). Moreover, the more time students spend using technology while attempting to complete schoolwork, the lower their GPAs (Junco & Cotten, 2012). Thus, while cell phones in class may sometimes enhance learning, "off task" use in the classroom may diminish these beneficial effects.

Evidence indicates that students are aware that cell phone use is dangerous to their grades, but yet persist in the activity compulsively. Burns and Lohenry (2010) reported that 53% of students admitted to texting in class. However, 85% of students considered cell phones to be distracting during class. Moreover, students are apparently aware that in-class cell phone use can be detrimental to their grades. Elder (2013) found that students reported expecting a decline in grades as a result of cell phone use. Nonetheless, many students persisted in using their phones in class, suggesting that cell phone use might be a compulsive activity. Students exhibiting less self-regulation are more likely to text in class, and have a hard time sustaining attention in class (Wei, Wang, & Klausner, 2012). The compulsion to use

cell phones has the potential to be a detriment to students' personal well being (Roberts, Yaya, & Manolis, 2014).

If in-class cell-phone use constitutes a compulsion, might it be associated with anxiety? Indeed, survey research shows that students who use their cell phones often are more likely to have lower GPAs and report more anxiety (Lepp et al., 2014). Social anxiety and poor self-esteem are also related to excessive cell phone use (You, Zhang, Zhang, Xu, & Chen, 2019). In-class texting is associated with impulsivity and an inability to delay gratification (Hayashi & Blessington, 2018). These results suggest that in-class cell phone use might be motivated by anxiety.

There is some evidence that cell phone use policies can mitigate the negative effects of cell phones in the classroom. Burns and Lohenry (2010) proposed five ways professors could combat the distraction of cell phone use in class. These proposed solutions included creating, implementing, and clearly communicating cell phone policies, as well as role modeling, reinforcing, and clearly communicating cell phone etiquette. Classroom policies on cell phone use vary widely and some policies are likely to be more effective than others. McDonald (2013) tested the efficacy of a restrictive cell phone use policy (cell phones banned in class) compared to no cell phone policy. On average, students in the no-policy courses suffered a decline in grades. However, Lancaster (2018) found no differences in student learning in classes featuring permissive and restrictive cell phone policies. Therefore, it is unclear whether and how cell phone policies affect student learning.

Berry and Westfall (2015) investigated students' perspectives of classroom cell phone policies. Students reported that the most punitive policies were also the most effective and the least punitive policies were the least effective. These results suggest that strict policies are needed to dissuade students from in-class cell phone use. However, cell phone policies might affect student evaluations of the class. Jackson (2013) reported that students feels annoyed when instructors ban the use of cell phones during class. However, Lancaster (2018) showed that students reported more positive evaluations of an instructor when the instructor used a restrictive cell phone policy compared to a permissive policy. Therefore, it is not entirely clear whether restrictive policies result in positive or negative student affect.

Our study examines the effects of a one-day intervention that varied cell phone policies in two introductory psychology course sections. One course section was given a lenient policy, while the other section was given a restrictive policy. We developed four hypotheses: First, we hypothesized that the class with the lenient policy would exhibit more cell phone use. Second, we expected that in-class cell phone use would predict lower quiz scores. Third, we expected participants with more anxiety to report more in-class cell phone use and lower GPAs. Finally, we expected students to self-report using their phones mostly for non-academic purposes.

Method

Participants

We recruited a convenience sample of 73 students (M age = 20.35, SD = 4.35; 35 female, 37 male) enrolled in two sections of an introductory psychology course at a public Midwestern Historically Black University (40 students were officially enrolled in each section). Our sample consisted of 47 African American students and 18 White students (8 students of other ethnicities). Students were observed and surveyed during class time. The Institutional Review Board reviewed and approved the study prior to data collection.

The two sections of the introductory course were randomly assigned to one of two groups: a restrictive cell phone policy or a lenient cell phone policy. In the restricted cell phone group, participants were explicitly told that cell phone use would be prohibited during the 50-minute lecture. Furthermore, instances of cell phone use detected by the professor would result in a deduction of two attendance points. In the restrictive condition, the professor made an attempt to record cell phone use while lecturing. This multitasking likely resulted in unrecorded instances of student cell phone use. In the lenient phone policy group, participants were told that phone use would not result in any deduction of points.

Both groups were presented the same lecture, in the same room (featuring theater-style seating), by the same professor, one hour apart. Prior to the assignment of conditions, there was no stated cell phone policy in either section. The manipulation took place approximately one month into the semester, on the same day for both groups. The manipulation of the lenient policy group preceded the restrictive group on that day. While students in the lenient policy group might have informed those in the restrictive group about the manipulation, that scenario is unlikely since the manipulation took place over two consecutive class hours with only a 10-minute transition between conditions.

Two observers attended the classes to record actual cell phone use during the 50-minute lectures. Students were told that the researchers were student teachers observing the techniques of the professor. Researchers sat in the back of the room and recorded all instances of phone use using a checklist.

At the end of the class period, students took a 10-question multiple-choice quiz over the lecture material and completed a survey. The survey measured demographics (e.g., gender, ethnicity), attitudes about cell phone use in class (e.g., "Students should be allowed to use cell phones in class;" 2 items; $\alpha = 0.74$), academic motivation ("I outline specific goals for my study time;" 8 items; $\alpha = .83$), tasks completed with cell phone during in-class phone use (5 tasks, see Table 1), and anxiety (e.g., "I worry too much about different things;" Spitzer, Williams, & Kroenke, 1999; 5 items; $\alpha = 0.81$). Apart from demographics, each question was followed by a 5-point Likert scale.

Results

We expected the lenient policy group to use their phones significantly more than the restrictive policy group. Our observations indicated that both sections used their cell phones an approximately equal amount regardless of whether the cell phone policy was lenient (45 instances of in-class cell phone use) or restrictive (43 instances), *Chi Square* = 0.04, $p = 0.83$.

We predicted that the class with the lenient policy would have lower quiz scores. The quiz scores between the two groups did not differ significantly. The restrictive-policy group ($M = 5.44$, $SD = 2.11$) had only slightly lower scores than the lenient-policy group ($M = 5.83$, $SD = 1.99$), $t\ (71) = 0.81$, $p = 0.42$. Both groups also reported similar academic motivation, $t\ (70) = -0.67$, $p = 0.50$, in-class cell phone use, $t\ (64) = 1.65$, $p = 0.10$, and anxiety, $t\ (70) = 1.40$, $p = 0.17$.

We anticipated that participants reporting more anxiety would report more in-class phone use. Contrary to what we expected, anxiety was not a predictor of in-class cell phone use, $r\ (65) = -.15$, $p = 0.23$. Predictably, academic motivation was significantly correlated with higher quiz scores, $r\ (72) = -0.28$, $p = 0.02$. Of note, students self-reported checking their phones an average of 6.92 times during a single 50-minute class period.

Students reported using their phones during class time for a variety of activities. While some students reported using their phones in class for academic purposes, it was more common for students to use their phones for entertainment and social media purposes (see Table 1).

Table 1. Self-Reported Typical Tasks Completed With Cell Phone

	Mean (scale =1-5)	Standard Deviation
Taking Class Notes	2.74	1.17
Completing Assignments	2.82	1.19
Contacting Professor	3.41	1.14
Entertainment	3.56	1.33
Social Media	4.10	1.00

Discussion

Our results suggest that punitive in-class cell phone policies like ours are likely to be ineffective. Cell phone use was high in our samples, and was not affected by the introduction of a lenient or restrictive policy. In the restrictive policy condition, the professor was unable to monitor cell phone use effectively while teaching, which may have rendered the policy ineffective. One of the most influential factors affecting cell phone use is class size (Tindell & Bohlander, 2012). With over 25 students, noticing individual instances of cell phone use might be impossible or overly distracting for a professor who is concentrating on the lesson. Being unaware of the extent of cell phone use, the faculty member might believe that his/her policies are effective. Berry and Westfall (2015) found that faculty self reported that almost all types of cell phone policies were effective, whereas students reported perceiving most cell phone policies as ineffective.

Perhaps stricter phone policies, such as making student phones inaccessible during class time, would be more likely to deter cell phone use (McDonald, 2013). However, there is a risk that stricter phone policies could be detrimental to the learning environment by making students focus on hiding their phone use, causing them to further dissociate from the class experience. Another potential drawback is that students reportedly dislike strict policies (Jackson, 2013). However, with cell phone use habits well established by the time students enter college, strong policies may be necessary to alter student behavior (McDonald, 2013).

Students report having trouble not using their phones during class (Roberts et al., 2014; Sunthilia, Ahmad, & Singh, 2016). Indeed, our data show consistently high cell phone use in both groups. Students using cell phones in class realize that the behavior has a negative impact on their grades, yet the activity seems difficult to control (Roberts et al., 2014; Sunthilia et al., 2016). Compulsive cell phone use suggests an association with anxiety, in which a student might experience anxiety relief from engaging in phone use. However, our data did not show that anxiety was associated with cell phone use. Rather, the positive reinforcements (e.g., social connectivity) inherent in phone use might increase the behavior (Puente & Balmori, 2007). Moreover, students may be unable to focus on the long-term rewards of paying attention in

class (e.g., gaining knowledge, better test scores, and an eventual degree) and instead give in to the immediate temptation to use their phones. Perhaps delaying the gratification of phone use can be trained (Murray, Theakston, & Wells, 2016). Interventions might focus on increasing self-regulation of cell phone use. Research suggests that individuals who have better delay of gratification skills also succeed better academically and socially throughout life (Yang & Wang, 2007).

A potential solution to the problem of distracting cell phones could be for professors to use cell phones in the classroom in structured ways that promote learning. Finding educationally relevant ways for students to use their phones in class may alleviate the compulsory need to use phones for non-academic purposes. For example, phone-based personal response systems can be effectively used to quiz students on course material or to increase class participation (Ma et al., 2018). Rogers (2009) suggests that for in-class cell phone use to be beneficial to students, guidelines and norms must be taught in middle and high school. Clear boundaries and enforceable consequences are imperative to the success of such an initiative (Weinstock, 2010). Even so, problems may occur when students access non course-related sites during class time (Madden, 2012). Indeed, our data suggests that students tend toward non-academic cell phone use in the classroom.

If punitive cell phone policies like ours are no better than the absence of a cell phone policy, the question remains whether there are any types of cell-phone policies that are effective. One possibility is to create a policy based on positive reinforcement, rather than punishment. A quasi-experiment by Katz and Lambert (2016) implemented a reward system for students who refrained from phone use during class. Students who handed in their phones at the beginning of class received one extra credit point toward their final grades. Katz and Lambert (2016) found that students handing in their phones showed better test scores, attendance, and semester GPA. Further research should investigate the topic of reinforcement-based cell phone policies.

Our study had several limitations. One major limitation was the short time frame of the policy manipulation. Students may need more than one class period to adapt to a professor's policy before making substantial behavior changes. Research should examine how long policies need to be in place before they show behavioral changes. A related limitation was the fact that the new policy was introduced midway though the semester. There may have been carry-over effects of the prior policy that affected our results. We do not have any means of knowing how seating arrangement or class size might have affected our results. Our observations of cell phone use only recorded number of instances of use, not duration of use. Checking the time on a cell phone for 1 second might be far less distracting than scrolling though Instagram for 10 minutes. Finally, our mostly African American sample may be different from other student samples insofar as cultural background might influence cell phone use patterns. For example, African Americans and Latinos are less likely to access the Internet on smart phones than other groups (Fairlie, 2017). Therefore, it may be hard to generalize our findings to other college student samples.

Our study suggests that punitive methods aimed at banning cell phone use in class may be somewhat ineffective. Students are using their phones predominantly for entertainment and social media purposes, which may distract from class material and could result in lower grades. Pedagogical methods that utilize phones in class for educational purposes pose a number of logistical difficulties, including the persistent need to control phone use for "off-task" activities. Further research should continue to investigate how the beneficial aspects of cell phones might be maximized while minimizing distraction from teaching and learning. Other topics for future research include investigation of how class size, teaching style, and seating arrangement affect cell phone use. Finally, researchers should explore the question of whether policies should be tailored to various cultural, ethnic, or age groups to maximize their effectiveness.

References

Berry, M.J., & Westfall, A. (2015). Dial d for distraction: The making and breaking of college cell phone policies in the college classroom. *College Teaching, 63,* 62–71. http://dx.doi.org/10.1080/87567555.2015.1005040

Bjornsen, C.A., & Archer, K. J. (2015). Relations between college students' cell phone use during class and grades. *Scholarship of Teaching and Learning in Psychology, 1,* 326–336. http://dx.doi.org/10.1037/stl0000045

Burns, S.M., & Lohenry, K. (2010). Cellular phone use in class: Implications for teaching and learning a pilot study. *College Student Journal, 44,* 805–810.

Duncan, D.K., Hoekstra, A.R., & Wilcox, B.R. (2012). Digital devices, distraction, and performance: Does in-class cell phone use reduce learning? *Astronomy Education Review, 11,* 1–4. http://dx.doi.org/10.3847/AER2012011

Elder, A.D. (2013). Effects of classroom cell phone use on expected and actual learning. *College Student Journal, 47,* 585–592.

Fairlie, R.W. (2017). Have we finally bridged the digital divide? Smart phone and Internet use patterns by race and

ethnicity. *First Monday, 22,* 1–11. https://doi.org/10.5210/fm.v22i9.7919

Froese, A. D., Carpenter, C. N., Inman, D. A., Schooley, J. R., Barnes, R. B., Brecht, P. W., & Chacon, J. D. (2012). Effects of classroom cell phone use on expected and actual learning. *College Student Journal, 46,* 323–332.

Hayashi, Y. & Blessington, G.P. (2018). A behavioral economic analysis of media multitasking: Delay discounting as an underlying process of texting in the classroom. *Computers in Human Behavior, 86,* 245–255.

Jackson, L.D. (2013). Is mobile technology in the classroom a helpful tool or a distraction?: A report of university students' attitudes, usage practices, and suggestions for policies. *International Journal of Technology, Knowledge & Society, 8,* 129–140. http://dx.doi.org/10.18848/1832-3669/CGP/v08i05/56335

Junco, R., & Cotten, S.R. (2012). No A 4 U: The relationship between multitasking and performance. *Computers & Education, 59,* 505–514. http://dx.doi.org/10.1016/j.compedu.2011.12.023

Kates, A. W., Wu, H., & Coryn, C. L. S. (2018). The effects of mobile phone use on academic performance: A meta-analysis. *Computers & Education, 127,* 107–112. http://dx.doi.org/10.1016/j.compedu.2018.08.012

Katz, L., & Lambert, W. (2016). A happy and engaged class without cell phones? It's easier than you think. *Teaching of Psychology, 43,* 340–345. http://dx.doi.org/10.1177/0098628316662767

Lancaster, A.L. (2018). Student learning with permissive and restrictive cell phone policies: A classroom experiment, *International Journal for the Scholarship of Teaching and Learning*, *12*, 5. https://doi.org/10.20429/ijsotl.2018.120105

Lepp, A., Barkley, J.E., & Karpinski, A.C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life among college students. *Computers in Human Behavior, 31,* 343–350. http://dx.doi.org/10.1016/j.chb.2013.10.049

Ma, S., Steger, D.G., Doolittle, P.E., & Stewart, A.C. (2018). Improved academic performance and student perceptions of learning through use of a cell phone-based personal response system, *Journal of Food Science Education, 17,* 27–32.

Madden, L. (2012). Cell phones transform a science methods course. *Educational Forum, 76,* 442–445. http://dx.doi.org/10.1080/00131725.2012.707571

McDonald, S.E. (2013). The effects and predictor value of in-class texting behavior on final course grades. *College Student Journal, 47,* 34–40.

Murray, J., Theakston, A., & Wells, A. (2016). Can the attention training technique turn one marshmallow into two? Improving children's ability to delay gratification. *Behavior Research and Therapy, 77,* 34–39. http://dx.doi.org/10.1016/j.brat.2015.11.009

Puente M, & Balmori A. (2007). Addiction to cell phones: are there neurophysiological mechanisms involved. *Project, 61,* 8–12.

Roberts, J. A. Yaya, L.H.P., & Manolis, C. (2014). The invisible addiction: Cell-phone activities and addiction among male and female college students. *Journal of Behavioral Addictions 3,* 254–265. http://dx.doi.org/10.1556/JBA.3.2014.015

Rogers, K.D. (2009). Cell phones as instructional tools. *Principal Leadership, 9,* 65–67.

Spitzer, R. L., Williams, J. B. W., & Kroenke, K. (1999). Anxiety Screening. Retrieved from www.mentalhealth america.net/mental-health-screen/anxiety

Sunthlia, A., Ahmad, S., & Singh, S.P. (2016). Menace of mobile phone overuse: an emerging public health concern. *International Journal of Community Medical Public Health, 3,* 153–156. http://dx.doi.org/10.18203/2394-6040.ijcmph20151552

Tindell, D. R., & Bohlander, R.W. (2012). The use and abuse of cell phones and text messaging in the classroom: A survey of college students. *College Teaching, 60,* 1–9. http://dx.doi.org/10.1080/87567555.2011.604802

Wei, F.F, Wang, Y.K., & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: Does text messaging during class influence cognitive learning? *Communication Education, 61,* 185–204. http://dx.doi.org/10.1080/03634523.2012.672755

Weinstock, J. (2010). Left to their own devices. *The Journal, 37,* 32–36.

Wood, E., Mirza, A., & Shaw, L. (2018). Using technology to promote classroom instruction: Assessing incidences of on-task and off-task multitasking and learning. *Journal of Computing in Higher Education*, *30*, 553–571 https://doi.org/10.1007/s12528-018-9185-1

Yang, L., & Wang, J. (2007). A follow-up study of self-imposed delay of gratification at age 4 as a predictor of children's school-based social competencies at age 9. *Acta Psychologica Sinica, 39*, 668–678.

You, Z., Zhang, Y., Zhang, L., Xu, Y., & Chen, X. (2019). How does self-esteem affect mobile phone addiction? The mediating role of social anxiety and interpersonal sensitivity. *Psychiatry Research, 271,* 526–531. https://doi.org/10.1016/j.psychres.2018.12.040