NBER WORKING PAPER SERIES

FROM DISTRACTION TO DEDICATION: COMMITMENT AND INCENTIVES AGAINST PHONE USE IN THE CLASSROOM

Billur Aksoy
Lester R. Lusher
Scott E. Carrell

Working Paper 33703
http://www.nber.org/papers/w33703

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2025

This work features a field experiment conducted in partnership with the phone app Pocket Points. The authors did not receive any financial compensation from Pocket Points. The experiment was funded utilizing an internal grant from Texas A&M University. Ethics approval was obtained from the IRB at Texas A&M University (IRB2017-0473D). The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

From Distraction to Dedication: Commitment and Incentives Against Phone Use in the Classroom
Billur Aksoy, Lester R. Lusher, and Scott E. Carrell
NBER Working Paper No. 33703
April 2025
JEL No. I21

ABSTRACT

Phone usage in the classroom has been linked to worsened academic outcomes. We present findings from a field experiment conducted at a large public university in partnership with an app marketed as a soft commitment device that provides incentives to reduce phone use in the classroom. We find that app usage led to improvements in classroom focus, attendance, and overall academic satisfaction. Analysis of time spent outside the classroom suggests a potential substitution effect: students using the app allocated less time to study, particularly on campus. Overall, though statistically insignificant, we find improvements in transcript grades associated with app usage.

Billur Aksoy
Department of Economics
Rensselaer Polytechnic Institute
3404 Russell Sage Laboratory
110 8th Street
Troy, NY 12180
aksoyb3@rpi.edu

Lester R. Lusher
Department of Economics
University of Pittsburgh
lesterlusher@pitt.edu

Scott E. Carrell
Department of Economics
University of Texas at Austin
2225 Speedway
Austin, TX 78712
and NBER
scott.carrell@austin.utexas.edu

1 Introduction

Smartphones have become a fixture for everyday life in the US. Smartphone usage rose 39% from 2019 to 2022[1], with the average American spending approximately two and a half hours per day on their phone, and nearly half of adult users state they cannot last longer than 24 hours without their phone.[2] An eminent concern with the growing dependency on phones is a type of self-control problem, where not only are owners reflexively using their phones regularly, but they're doing so in settings which could carry harsh consequences. For instance, 81% of Americans spend time looking at their phones while dining out, despite the fact that 62% of adults have a disagreeable opinion on doing so (Eadicicco, 2015; Rainie and Perrin, 2017). In the workplace, 48% of employers report phone distractions compromising the quality of their employee's work, which subsequently leads to several other harmful consequences, such as coworkers having to pick up the slack (38%). Correspondingly, 75% of employers have made efforts to control productivity issues, including blocking Internet sites (32%) and banning cellphone use altogether (26%) (Farber, 2016). On US roads, the National Safety Council (2017) reports that one in every four car accidents is caused by texting while driving, a rate that is six times that of the accident rate of driving drunk. In turn, 94% of drivers support a ban on texting while driving, and 74% of drivers support an overall ban on hand-held cell phone use.

Another setting with a rampant amount of undesirable phone usage is the classroom. Prior studies shows that students frequently engage in non-academic activities on their phones during class. For instance, students check their phones in the classroom multiple times a day, with nearly 20% of their classroom time being spent for activities unrelated to class (McCoy, 2016). Texting is especially common during class, with some students admitting to having texted during an exam on at least one occasion (Tindell and Bohlander, 2012). Even when students are aware they are being monitored during lecture, they still spent up to a third of class time surfing the web to nonacademic sites (Ravizza et al., 2017). More broadly, increasing levels of mobile phone usage among the youth have been correlated with concerning drops in adolescent mental health (Girela-Serrano et al., 2024).

In this study, we present results from a field experiment conducted in partnership with the phone app Pocket Points. Pocket Points is marketed as a soft commitment device and provides incentives for students to stay off of their phones. In particular, Pocket Points rewards students with "points" for staying off their phones during class: Students open the app, lock their phone, and start accumulating points, all while the app verifies through GPS coordinates that the student

[1]Source: insiderintelligence. Website: https://www.insiderintelligence.com/insights/mobile-users-smartphone-usage/, retrieved October 17, 2023.

[2]Source: Zippia. Website: zippia.com/advice/us-smartphone-industry-statistics, retrieved August 24, 2023. Zippia also estimates that the average smartphone user touches their phone 2,617 times per day.

is indeed in class. These points can then be used to get discounts at participating local and online businesses. First launched in 2014, Pocket Points quickly grew in popularity, reaching over 100 universities and 200,000 downloads within its first year of inception.[3,4]

In the fall semester of 2017, we conducted an encouragement design field experiment with Pocket Points at Texas A&M University (TAMU). During the beginning weeks of the semester, 1,000 subjects from the population of undergraduate TAMU students were recruited to participate in the study, and after the deadline to add or drop classes, approximately half received the treatment and were instructed to download the Pocket Points app and create an account using their university email address. Students were informed that upon downloading the app, they could do anything they wanted, including immediately deleting the app. Both the treatment and the control emails can be seen in Appendix A.2. Prior to the launch of the experiment, Pocket Points had a sizable userbase within TAMU, and so numerous local vendors were already offering rewards to students in exchange for their points. Naturally, some of the 1,000 subjects were already Pocket Points users, so randomization was stratified by whether the student already had a Pocket Points account. The purpose of this treatment was to "nudge" or "encourage" students to use the Pocket Points app, and thus generate a plausible instrumental variable for Pocket Points usage. At the end of the semester, students (both control and the nudged) completed a survey, and student transcripts for all participants were provided directly from the TAMU registrar's office.

We first estimate significant demand for the app: Treatment led to an over 19 percentage point increase in the likelihood of using the app during the semester. Then, to identify which types of students demanded the app, we compare average characteristics of app users vs. non-users, conditional on receiving treatment (since this assures that the entire sample was aware of the app). We find that female students, students who were enrolled in more credits for the semester, and more patient students were more likely to download and use the app. We do not find evidence of various measures of potential sophistication and demand for commitment, such as self-identified issues with procrastination or present bias preferences, to be correlated with demand for the app. Thus, evidence suggests that demand for Pocket Points is likely driven by the incentive component of the app, as opposed to potentially sophisticated agents demanding commitment (O'Donoghue and Rabin, 1999; Bryan et al., 2010; Laibson, 2015).

We then find that usage of the app improved student outcomes. Reduced form estimates of the impacts of treatment on self-reported outcomes suggest that students felt less distracted by

[3]Source: USA Today. Website: https://www.usatoday.com/story/college/2015/09/23/pocket-points-app-rewards-students-for-staying-off-their-phones-in-class/37406563/, retrieved August 25, 2023.

[4]Although the app was relatively popular during the time of our experiment, the company became dormant during the Covid-19 pandemic, likely due to universities moving to online instruction. Currently, the app is unavailable for download on both Apple and Google Play platforms. Despite this, our research underscores the demand and benefits for such products within the educational sector.

their phones in class and were more satisfied with their academic performance for the semester. Instrumental variable estimates imply that usage of the app for more than once a week led to about a one standard deviation decrease in feeling distracted in class and approximately a one standard deviation increase in academic satisfaction. Though not statistically significant, we additionally find that treatment students were less likely to miss or skip their classes during the semester.

Interestingly, we find that these positive classroom effects are associated with reductions in time spent on other human capital related activities. For example, we see a statistically significant decrease on a composite index of time spent studying, which is largely driven by a substantial decrease in time spent studying while on campus. Thus, it appears that the gains made in the classroom (in terms of attendance and focus) led to substitutions away from time invested outside the classroom.

To estimate the net effect of these behavioral changes, we utilize data directly obtained from student transcripts. Although the estimates are not statistically significant, there is some evidence of an overall positive effect of improved student outcomes as a result of the app usage. We find that on average, treatment students outperformed control students by between 0.05 to 0.07 grade point units (scale 0 to 4). Our IV models suggest using the app more than once a week led to an increase in GPA by nearly 0.50 grade point units.

To summarize our results, we create two outcome indices: one for classroom outcomes, including factors such as attendance and GPA, and the previously mentioned index for time spent studying outside the classroom. Results utilizing these indices confirm our main findings: Utilizing the app caused improved outcomes in the classroom and reduced studying outside the classroom.

Despite the lack of statistically significant results on student GPAs, our findings contribute pioneering evidence to an emerging area of research by examining the potential impacts of commitment devices and incentives in reducing phone use. As a first-of-its-kind study, it opens up an essential dialogue on the role of behavioral interventions involving technology and smartphones in education. The importance of our research lies not only in its innovative approach, but also in the new questions it raises for further research and its potential to inspire refinements in educational interventions as well as in other contexts where reducing undesired phone use is critical.

Our research makes important contributions to various strands of literature. Despite acknowledged concerns centered on phone habits, there remains a severe disconnect between intention and action to reduce phone usage. According to a survey conducted in 2017, 47% of US smartphone owners have made an effort to limit their phone use in the past, but only 30% have succeeded in doing so.[5] Utilizing a model of digital addiction paired with an experiment, Allcott et al. (2022) estimate that 31% of social media use can be directly attributed to self-control problems.[6] In order to

[5]Source: Statista. Website: https://www.statista.com/chart/12403/smartphone-addiction/, retrieved August 25, 2023.

[6]For other experiments on social media use, see Allcott et al. (2020) and Aridor (2022). See Aridor et al. (2024)

help agents combat problems of self-control, studies from a variety of domains, including savings (e.g. Thaler and Benartzi, 2004; Ashraf et al., 2006; Beshears et al., 2013), exercise (e.g. Royer et al., 2015; Carrera et al., 2018, 2022), and smoking cessation (e.g. Giné et al., 2010; Cahill et al., 2015), have investigated the efficacy of providing incentives and commitment devices. However, most of this literature has predominantly focused on self-control challenges related to health and financial savings, and our study breaks new ground by explicitly addressing self-control issues in an educational context.

The detrimental impact of phone use on academic performance is well-documented in numerous correlational studies (see Amez and Baert, 2020, for a literature review). In 2016, nearly two thirds of public schools banned cell phones and other devices (Zhang et al., 2018). However, considerable debate continues today on policies related to banning or controlling phone usage in the classroom with growing concerns of school safety. Additionally, the research on the effectiveness of such policies has yielded mixed results across various educational settings and contexts (Beland and Murphy, 2016; Kessel et al., 2020; Beneito and Vicente-Chirivella, 2022). Beyond the negative impact in the classroom, cellphone use and addiction has been linked to a wide range of detrimental consequences, including lower worker productivity (Chadi et al., 2022), unsafe driving, fertility issues, depression, poor sleep quality, and relationship conflicts.[7] Therefore, another significant advantage of the Pocket Points app (or a similar market-based device) is its ability to address cellphone addiction, a self-control problem that likely affects a much larger population beyond the confines of the classroom.

Finally, our study also contributes to a growing literature investigating a wide array of benefits and consequences from the expansion of mobile technology via phone apps. For instance, Dills and Mulholland (2018) find that the introduction of Uber across US counties resulted in fewer DUIs and road fatalities, with similar effects observed in Brazil, where Barreto et al. (2021) report a reduction in traffic hospitializations and fatalities in response to Uber's introduction in Brazil. Other research has explored the impacts of specific apps, such as the Pokemon GO app (a popular augmented reality game). Al-Bahrani et al. (2018) identify its positive impacts in the classroom, while Faccio and McConnell (2020) highlight its negative impacts on the roads. Additionally, personal finance apps have been shown to improve financial knowledge and skills as demonstrated by French et al. (2021a) and French et al. (2021b). Though the evidence is mixed, mindfulness apps have also been linked to positive outcomes such as reduced stress and improved sleep (see O'Daffer et al. (2022) for a review). Our study contributes to this growing literature by partnering with a novel app and identifying the (causal) effects of utilizing the app on user outcomes - to

for a review on the economics of social media.

[7] See https://www.psychguides.com/behavioral-disorders/cell-phone-addiction/signs-and-symptoms/ and citations therein. Retrieved August 25, 2023.

do so, our study is also the first to conduct a field experiment with the app, whereas the previous literature relied on either small-scale RCTs or natural (difference-in-differences) variation in the introduction of the app. Since Pocket Points also provided financial incentives to students, our paper also relates to an extensive literature investigating the efficacy of monetary incentives in the classroom (see Gneezy et al. (2011) for a review.).

2 The Pocket Points App

This paper centers on a field experiment conducted with Pocket Points, a mobile app that was first developed in 2014. The app provides a foundation for students to commit to staying off of their phones, and subsequently "rewards" students if they succeed in keeping their phones locked. To participate in Pocket Points, the student first opens the app. The app then uses geo-fence technology to verify whether the student is in an academic building on a school campus. The student can then lock their phone and start accumulating "points" at a linear rate (per minute off the phone). Students may also enter a "commitment length" of time (minimum of 10 minutes), in which they receive a larger, lump sum of points only if they keep their phone locked during the entirety of the period. Students are free to break their commitment at any point by unlocking their phone.

Points cannot be earned at non-academic buildings, including dorm rooms and school gyms. Though the app is advertised for use in the classroom, students can still use the app and earn points so long as they are in an academic building on campus. During the time frame of our field experiment, points could only be earned on university campuses (whereas later, Pocket Points offered other features to earn points outside of campuses). Points can then be used for coupons and discounts at participating local and online retailers. See Figure A1 for screenshots from the Pocket Points app provided on `pocketpoints.com`.

3 Experimental design and econometric specifications

3.1 Experimental design

All undergraduate students at Texas A&M University (TAMU) were invited to participate in the study, which can be decomposed into three stages. Students who successfully completed all three stages were entered into a drawing for a chance to be one of the twelve recipients to receive $100. First, an online initial sign-up was circulated at the beginning of the Fall 2017 semester to a university-wide list of email addresses. The sign-up collected basic information on students ("Baseline Survey"), as well as provided information about the study. Students were told that as

part of the study, they would potentially be asked to download and create an account with a phone app; they were additionally told that, if selected, they would not have to utilize the app beyond creating an account. The specific phone app (Pocket Points) was not disclosed during this stage. Students who completed the initial sign-up signed a FERPA waiver letting the university release transcript-related information directly to the researchers.[8]

The second stage of the study began after sign-ups closed, which involved randomly assigning approximately one-half of participants into the "treatment" group. This randomization was carried out after the last day students could add or drop their courses, and was stratified by whether the student had indicated in the Baseline Survey whether they had previously used Pocket Points (among a long list of phone apps). All treatment students were then asked to download the Pocket Points app and create an account using their TAMU email address. The idea behind this "encouragement" treatment was to generate an instrumental variable for Pocket Points usage (Banerjee and Duflo, 2017). While students in the treatment group may not comply with downloading Pocket Points, and some control students may use Pocket Points regardless, the goal of the encouragement design is to generate a strong, exogenous predictor for using the app.

The third stage of the experiment came at the end of the semester, where we asked participants to complete an "End-of-Semester Survey". This survey collected a series of self-reported outcomes, including focus in the classroom, academic satisfaction, and course attendance. The full list of survey questions can be found in the online appendix. Though we were guaranteed reception of university transcripts for all participants, not all participants completed this third stage survey (724 of 1,000 participants). In later analysis, we consider whether there were differential survey completion rates by regressing an indicator for survey completion on treatment assignment and a vector of student controls. We find no statistically significant difference in the completion rate of the End-of-Semester Survey between the treatment and control group (see column 2 of Table 2), and so future analyses using the survey sample and/or responses are unlikely to suffer from an attrition bias. Finally, one concern we cannot address with the End-of-Semester Survey stems from potential experimenter demand effects - if participants in the treatment group select responses differently from the control group due to what they believe the experimenters may want to find, then estimates using outcomes from the End-of-Semester Survey would be biased.

3.2 Summary statistics and tests for random assignment

In this section, we test for whether there are any statistically significant differences in observable characteristics between the treatment and control groups in order to address potential concerns

[8] A total of 1154 students (including 142 graduate students) completed the sign-up sheet. Since the study was open to undergraduate students only, we exclude the 142 graduate students. Additionally, we were not able to obtain data from the registrar's office for 12 students which we also exclude from our sample.

of unobservables that correlate with assignment and student outcomes. All covariates in this analysis come from student answers to the Baseline Survey, which were collected prior to treatment assignment.

The first three columns of Table 1 present our tests for balance, where we display average student characteristics by group and calculate whether the difference between the treatment and control group is statistically significant for each characteristic. The only variable that correlates with treatment is the indicator for whether the student had difficulty committing to goals - Treatment students were 6.9 percentage points more likely to have difficulty with goal commitment. At the bottom of the third column of Table 1, the F-statistic and p-value are reported from a test for whether the coefficients are jointly equal to zero from a regression of an indicator for treatment on the set of student survey responses, credits taken during the semester, and pre-treatment Pocket Points usage. With a p-value of 0.721, we fail to reject the null hypothesis that the coefficients are jointly equal to zero and conclude that the randomization is well balanced. In other words, the sole significant indicator (difficulty with goal commitment) can likely be attributed to random sampling variation.

3.3 Econometric specifications

To investigate how usage of Pocket Points influences student outcomes, we estimate the following specification:

$$Y_i = \alpha + \beta \mathsf{AppUse}_i + \delta \mathsf{X}_i + \epsilon_i \tag{1}$$

where Y_i is an outcome for student i (focus in the classroom, class attendance, academic satisfaction, GPA), AppUse_i[9] is an indicator for utilizing the Pocket Points app for student i, and X_i is a vector of other student characteristics that might influence their outcomes. The coefficient of interest is β, which reflects the predicted increase in Y_i for students who use Pocket Points relative to students who don't use Pocket Points. If one were to use naturally occurring data to identify this equation, estimates for β would likely be biased due to omitted variables in ϵ_i that correlate with AppUse_i and Y_i. For instance, it may be that students with a higher propensity to study are more likely to a) use Pocket Points and b) earn better grades. Hence, absent sufficient controls for studying behavior, an estimate for β would be positively biased.

Given our experimental setting, we can instrument for AppUse_i with an indicator for whether

[9]We use two main indicators for Pocket Points utilization. The first one is "Used app at least once" which is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is obtained from the Pocket Points company. The second one is "Used app $>$ once a week" which is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester survey.

the student was assigned into the encouragement treatment (T_i). Adopting a two stage least squares approach, we can first estimate whether treatment influenced Pocket Points usage:

$$\mathsf{AppUse}_i = \alpha + \gamma T_i + \delta \mathsf{X}_i + \epsilon_i. \tag{2}$$

The estimated coefficient γ reports the predicted increase in likelihood of using Pocket Points in response to our randomly assigned treatment. For the second stage, we estimate:

$$Y_i = \alpha + \beta \widehat{\mathsf{AppUse}}_i + \delta \mathsf{X}_i + \epsilon_i \tag{3}$$

where $\widehat{\mathsf{AppUse}}_i$ holds the predicted values generated from the first stage. Our estimate for β can then be interpreted as the causal effect of using Pocket Points on student outcomes, assuming that the nudge to download Pocket Points only influenced student outcomes through their subsequent use of Pocket Points during the semester.

Finally, we also consider the reduced form equation:

$$Y_i = \alpha + \phi T_i + \delta \mathsf{X}_i + \epsilon_i \tag{4}$$

where ϕ reports the impact of receiving the encouragement treatment on student outcomes. That is, our estimate for ϕ is the conditional predicted difference in an outcome between treatment and control students in response to receiving the nudge to use Pocket Points, and would also capture other potential behavioral responses to receiving the nudge. For example, treated students may have looked into other types of commitment devices as well, or the nudge treatment may have conveyed the message that paying attention in class is important, and thus decreased phone usage during class. Any potential "encouragement" effect may also carry greater policy relevance, since any policy encouraging decreased phone usage in the classroom will come with both compliers and non-compliers. Of course, one concern with solely relying on reduced form estimates in our context is that, as shown in Table 1, many control students were already exposed to and utilizing the Pocket Points app, thus muddying the interpretation of ϕ. For completeness, we present results across both instrumental variables and reduced form approaches.

Our student-level controls for X_i, which are collected as part of the Baseline Survey, include the number of classes the student was enrolled in, the number of units enrolled in (for a letter grade) for the semester, indicators for gender, class year (e.g. Freshman), how often the student checked their phones during a typical class, approximately what percentage of the class time they spend checking their phones, number of lectures missed in a typical week, being distracted by phone in class, having issues with procrastination, having issues with committing to goals, frequency of pulling an "all-nighter", having present bias preferences, and whether they were a Pocket Points user prior to the experiment.

4 Results

4.1 Selection into the Pocket Points App

First, we investigate whether our encouragement treatment led to increases in Pocket Points usage. In Table 2, we estimate equation (2) for several different measurements of AppUse_i, including indicators for whether they downloaded the app, whether they used the app at least once, and (self-reported) whether they used the app more than once a week during the semester. For the first two measures, we also separately consider the full sample (those who signed up for the study at the beginning of the semester) and the survey subsample (those who completed the End-of-Semester Survey). Across all dependent variables and samples, we find large and statistically significant first-stage effects. As presented in Table 2, for our survey sample, we find that treatment students were about 25 percentage points more likely to download the app (column 3) and over 31 percentage points more likely to use the app (column 5) than control students. Additionally, treatment students were 13 percentage points more likely to use the app more than once a week (column 6).

Next, we investigate what types of students were interested in using the app. To do so, we observe the averages of student characteristics across those who used the app at least once versus those who did not, conditional on being assigned into the treatment group, and test for any statistically significant differences across these averages. By focusing strictly on the treatment group, we can assume that observed disuse of Pocket Points cannot be attributed to a lack of awareness of the app itself. These results are presented in the last three columns of Table 1.

Conditional on receiving the encouragement email, we first find that students who used the app were enrolled in more credits for the term than those who did not use the app. This is perhaps unsurprising since, all else equal, students who are enrolled in more credits have more lectures to attend, and thus could potentially reap more reward from utilizing the app. Next, we find that students who were prior Pocket Points users were significantly more likely to be a user for the treatment semester.[10] Again, this is unsurprising, as those who were a previous user were already familiar with the app and/or were already using the app for the semester prior to being assigned the treatment. Third, we see that female students were significantly more likely to use the app compared to others. The fourth and final significant predictor of demand is impatience: Those who were flagged as being more impatient were less likely to demand the app. Interestingly, we find no evidence that those who self-state as having issues with being distracted by their phone during class or while studying were more likely to use the app.

[10] Conditional on being in the treatment group, 52.8% of those who used the app during the treatment semester had used the app in a previous semester (i.e. are prior users), compared to just 28.4% of those who did not use the app during the treatment semester.

4.2 Effectiveness of the Pocket Points App

Next, we study the impact of the app use on student academic performance.[11] Table 3 presents our main results for student self-reported outcomes via the End-of-Semester Survey. Each cell considers a separate regression. Each panel considers a separate outcome variable of interest: the frequency of the student feeling distracted by their phone when in class (reported on a scale from 1 to 5, standardized), whether the student attended all of their classes during the semester, and the degree of satisfaction the student felt with their academic performance (reported on a scale from 1 to 5, standardized). Column (1) considers our "reduced form" specification from equation (4) which estimates the direct impact of the encouragement treatment on student outcomes. The next two columns report estimated β's from specification (3), the second stage of our IV estimation, using two different measurements for AppUse_i: whether the student used the app at least once, and whether the student used the app more than once a week.

From the first panel, we observe large and statistically significant decreases in phone distraction rates in the classroom. From column (1), we predict a 0.13 standard deviation decrease in phone distraction rate for students who were encouraged to use the Pocket Points app; from column (2), we estimate that Pocket Points usage is associated with a 0.42 standard deviation reduction in phone distraction rate in the classroom. When we turn to attendance, our estimates become statistically insignificant, but nevertheless suggest increases in class-going; from column (2), we estimate about a 15 percentage point increase in the likelihood the student missed zero classes in response to using the Pocket Points app at least once. In the final panel, we observe increases in student satisfaction with their academic performance for the semester: Students who used the app more than once a week experienced more than a one standard deviation increase in satisfaction (column 3). Overall, results from the End-of-Semester Survey suggest that Pocket Points positively influences students' outcomes.

Given that students were (statistically insignificantly) less likely to miss their classes, and that they felt less distracted during their classes, a natural question arises as to whether time spent elsewhere was affected. For example, a better experience in the classroom could motivate students to exert greater effort outside the classroom in the event of learning complementarities. On the other hand, students could substitute away from studying outside the classroom due to their increased learning in the classroom.

To consider these possibilities, our survey asked students how many hours per week they spent on campus, how many hours per week they spent studying, and how many hours per week they spent studying on campus. From the first two panels of Table 4, we see that treated students spent fewer hours on campus and fewer hours per week studying overall, though these estimates

[11] Table A1 in the online appendix reports means and standard deviations for all of our outcome variables, separately for the treatment and the control groups.

are statistically insignificant. Then, in the third panel, we estimate significant decreases in time spent studying on campus. In Appendix Table A1, we report the summary statistics for the time spent variables (and other outcome variables), and see that treated students spent approximately 18.2 hours/week studying, 12.0 of which were on campus, whereas control students spent 20.3 hours/week studying, 14.1 of which were on campus. Thus, it appears that the increased learning and attendance in the classroom came with a reduction in time spent studying.[12]

Thus far, our findings indicate that the use of the Pocket Points app is associated with reduced classroom distractions, a lower likelihood of missing classes, and increased academic satisfaction among students. However, it appears that treated students are reallocating their time away from independent study outside the classroom, potentially because they find their in-class learning experiences more beneficial. To assess the overall impact of these shifts in student behavior resulting from app usage, we next examine the effect on course grades as measured by grade point average (GPA).

We present results for GPA outcomes in Table 5. The first two columns consider our reduced form specification (4), while the latter three columns consider our IV approach. Results are also split by the full sample of sign-ups (n=1,000) versus the sample that completed End-of-Semester Survey (n=724). In the first panel, we find that treatment was associated with a 0.05 to 0.07 GPA increase on average for treatment students. From our IV estimates, students who used the app more than once a week experienced a 0.50 unit increase in GPA. These estimates, however, are statistically insignificant (p-values $\sim$0.2). Put together, these results are consistent with the idea that attending class leads to greater returns for students relative to missing class and studying on their own.

Finally, to summarize our results, in Table 6 we present results from two composite indices, one measuring outcomes in the classroom and the other measuring time spent studying. The classroom outcomes index is constructed using all of the outcome from Table 3 and GPA, while the studying index is constructed using the two variables from Table 4 measuring time spent studying. Results from both the reduced form and IV models confirm our main takeaways from the intervention: Treatment and subsequent use of the app lead to positive classroom outcomes, with substitution away in time spent studying.

[12]These results relate to Pop-Eleches and Urquiola (2013), who find that parents of high school students spent less effort on their children when their children attended a better school. The authors also find a net positive effect of attending a better school on student test scores.

5 Conclusion and Discussion

Many phone users suffer from a self-control problem (Allcott et al., 2022). Researches and policymakers alike have expressed serious concern over the consequences of cell phone addiction among youth, and in particular, how such issues affect learning in the classroom. Indeed, numerous correlational studies have linked cell phone usage to reduced student outcomes (Amez and Baert, 2020). Studies from contexts outside of education have illustrated how commitment devices and incentives could be utilized to help agents battle issues of self-control (e.g. Giné et al., 2010; Royer et al., 2015; Carrera et al., 2022).

We run a field experiment at a large public university in partnership with Pocket Points, an app marketed as a commitment device which additionally provides incentives for students to reduce phone use in the classroom. Our data yields several noteworthy findings regarding the impact of Pocket Points on students' academic performance. We first estimate significant demand for Pocket Points, which is not driven by measures of present bias preferences or issues with procrastination, suggesting demand is largely driven by the incentive component of the app. We then find that app use is associated with reduced classroom distractions and increased academic satisfaction among students. Though not statistically significant, we additionally find a lower likelihood of missing classes and higher grades for treated students. The substantial reduction in classroom distractions, along with improved academic satisfaction and performance, underscore the potential of apps like Pocket Points to enhance the educational experiences and outcomes. Our results also broadly highlight the potential for market-based commitment devices and monetary incentives to improve outcomes across various settings outside of education as well: For example, Pockets Points has features related to staying off the phone while at work and while driving; other apps such as Hold,[13] Lock&Stock,[14] and Forest,[15] also reward users in various ways for staying off their phones. In general, our findings should encourage future work to investigate the efficacy of app-based interventions to promote improved individual outcomes.

Another natural consideration is whether administrators and policy-makers should consider cell phone bans, rather than relying on incentivizes and/or self-commitment devices such as Pocket Points. Evidence from Beland and Murphy (2016) found improved high school student test scores in response to a cell phone ban, but later evidence from Kessel et al. (2020) partly replicates Beland and Murphy (2016) and significantly expands their sample size to precisely estimate no effect of a cell phone ban. A cell phone ban may be attractive relative to other contexts with self-control issues (like banning cigarettes to curb smoking cessation) since such a ban would impact a significantly larger share of agents.

[13]Website: https://www.hold.app/, retrieved April 12, 2024.
[14]Website: https://lock-stock.en.softonic.com/android, retrieved April 12, 2024.
[15]Website: https://www.forestapp.cc/, retrieved April 12, 2024.

In practice, however, phone usage has become increasingly ingrained into everyday life, making policies such as cell phone bans more challenging to implement. Moreover, such blanket policies such as a phone ban in school or class do not target the actual self-control problem inflicting students. This is important because it is possible that access to a phone produces some positive outcomes for students, depending on the context, particularly given nearly half of all web traffic is done via phones. Thus, an ideal intervention would likely involve both incentives and self-commitment mechanisms. Future research could explore whether incentives, self-commitment mechanisms, or a combination of both would be most effective.

References

AL-BAHRANI, A., D. MAHON, G. D. MATEER, P. R. MURPHY, ET AL. (2018): "Pokémon GO: Applications for the economics classroom," *Journal of Economics Teaching*, 3, 218–231.

ALLCOTT, H., L. BRAGHIERI, S. EICHMEYER, AND M. GENTZKOW (2020): "The welfare effects of social media," *American economic review*, 110, 629–676.

ALLCOTT, H., M. GENTZKOW, AND L. SONG (2022): "Digital addiction," *American Economic Review*, 112, 2424–2463.

AMEZ, S. AND S. BAERT (2020): "Smartphone use and academic performance: A literature review," *International Journal of Educational Research*, 103, 101618.

ARIDOR, G. (2022): "Measuring substitution patterns in the attention economy: An experimental approach," .

ARIDOR, G., R. JIMÉNEZ-DURÁN, R. LEVY, AND L. SONG (2024): "The economics of social media," *Journal of Economic Literature*, 62, 1422–1474.

ASHRAF, N., D. KARLAN, AND W. YIN (2006): "Deposit collectors," *Advances in Economic Analysis & Policy*, 5.

BANERJEE, A. V. AND E. DUFLO (2017): "An introduction to the "Handbook of Field Experiments."," *Handbook of economic field experiments*, 1, 1–24.

BARRETO, Y., R. D. M. S. NETO, AND L. CARAZZA (2021): "Uber and traffic safety: Evidence from Brazilian cities," *Journal of Urban Economics*, 123, 103347.

BELAND, L.-P. AND R. MURPHY (2016): "Ill communication: technology, distraction & student performance," *Labour Economics*, 41, 61–76.

BENEITO, P. AND Ó. VICENTE-CHIRIVELLA (2022): "Banning mobile phones in schools: evidence from regional-level policies in Spain," *Applied Economic Analysis*, 30, 153–175.

BESHEARS, J., J. J. CHOI, D. LAIBSON, AND B. C. MADRIAN (2013): "Simplification and saving," *Journal of economic behavior & organization*, 95, 130–145.

BRYAN, G., D. KARLAN, AND S. NELSON (2010): "Commitment devices," *Annu. Rev. Econ.*, 2, 671–698.

CAHILL, K., J. HARTMANN-BOYCE, AND R. PERERA (2015): "Incentives for smoking cessation." *Cochrane Database of Systematic Reviews*.

CARRERA, M., H. ROYER, M. STEHR, AND J. SYDNOR (2018): "Can financial incentives help people trying to establish new habits? Experimental evidence with new gym members," *Journal of health economics*, 58, 202–214.

CARRERA, M., H. ROYER, M. STEHR, J. SYDNOR, AND D. TAUBINSKY (2022): "Who chooses commitment? Evidence and welfare implications," *The Review of Economic Studies*, 89, 1205–1244.

CHADI, A., M. MECHTEL, AND V. MERTINS (2022): "Smartphone bans and workplace performance," *Experimental Economics*, 25, 287–317.

DILLS, A. K. AND S. E. MULHOLLAND (2018): "Ride-sharing, fatal crashes, and crime," *Southern Economic Journal*, 84, 965–991.

EADICICCIO, L. (2015): "Americans Check Their Phones 8 Billion Times a Day," http://time.com/4147614/smartphone-usage-us-2015/, accessed: 2018-07-23.

FACCIO, M. AND J. J. MCCONNELL (2020): "Death by Pokémon GO: The economic and human cost of using apps while driving," *Journal of Risk and Insurance*, 87, 815–849.

FARBER, M. (2016): "Smartphones Are Making You Slack Off at Work," http://fortune.com/2016/06/09/smartphones-making-you-slack-at-work-survey/, accessed: 2018-07-23.

FRENCH, D., D. MCKILLOP, AND E. STEWART (2021a): "The effectiveness of smartphone apps in improving financial capability," in *Financial Literacy and Responsible Finance in the FinTech Era*, Routledge, 6–22.

——— (2021b): "Personal finance apps and low-income households," *Strategic Change*, 30, 367–375.

GINÉ, X., D. KARLAN, AND J. ZINMAN (2010): "Put your money where your butt is: a commitment contract for smoking cessation," *American Economic Journal: Applied Economics*, 213–235.

GIRELA-SERRANO, B. M., A. D. SPIERS, L. RUOTONG, S. GANGADIA, M. B. TOLEDANO, AND M. DI SIMPLICIO (2024): "Impact of mobile phones and wireless devices use on children and adolescents' mental health: a systematic review," *European child & adolescent psychiatry*, 33, 1621–1651.

GNEEZY, U., S. MEIER, AND P. REY-BIEL (2011): "When and why incentives (don't) work to modify behavior," *Journal of economic perspectives*, 25, 191–210.

KESSEL, D., H. L. HARDARDOTTIR, AND B. TYREFORS (2020): "The impact of banning mobile phones in Swedish secondary schools," *Economics of Education Review*, 77, 102009.

LAIBSON, D. (2015): "Why don't present-biased agents make commitments?" *American Economic Review*, 105, 267–272.

MCCOY, B. R. (2016): "Digital distractions in the classroom phase II: Student classroom use of digital devices for non-class related purposes," *Journal of Media Education*.

NATIONAL SAFETY COUNCIL (2017): "Texting and Driving Accident Statistics," https://www.edgarsnyder.com/car-accident/cause-of-accident/cell-phone/cell-phone-statistics.html, accessed: 2018-07-23.

O'DAFFER, A., S. F. COLT, A. R. WASIL, N. LAU, ET AL. (2022): "Efficacy and conflicts of interest in randomized controlled trials evaluating Headspace and calm apps: systematic review," *JMIR mental health*, 9, e40924.

O'DONOGHUE, T. AND M. RABIN (1999): "Doing it now or later," *American economic review*, 89, 103–124.

POP-ELECHES, C. AND M. URQUIOLA (2013): "Going to a better school: Effects and behavioral responses," *American Economic Review*, 103, 1289–1324.

RAINIE, L. AND A. PERRIN (2017): "10 facts about smartphones as the iPhone turns 10," http://www.pewresearch.org/fact-tank/2017/06/28/10-facts-about-smartphones/, accessed: 2018-07-23.

RAVIZZA, S. M., M. G. UITVLUGT, AND K. M. FENN (2017): "Logged in and zoned out: How laptop internet use relates to classroom learning," *Psychological science*, 28, 171–180.

ROYER, H., M. STEHR, AND J. SYDNOR (2015): "Incentives, Commitments, and Habit Formation in Exercise: Evidence from a Field Experiment with Workers at a Fortune-500 Company," *American Economic Journal: Applied Economics*, 7, 51–84.

THALER, R. H. AND S. BENARTZI (2004): "Save more tomorrow: Using behavioral economics to increase employee saving," *Journal of political Economy*, 112, S164–S187.

TINDELL, D. R. AND R. W. BOHLANDER (2012): "The use and abuse of cell phones and text messaging in the classroom: A survey of college students," *College Teaching*, 60, 1–9.

ZHANG, A., K. WANG, J. ZHANG, J. KEMP, M. DILIBERTI, AND B. A. OUDEKERK (2018): "Indicators of School Crime and Safety: 2017. NCES 2018-036/NCJ 251413." *National Center for Education Statistics*.

Main Tables and Figures

Table 1: Summary statistics, balance test, and demand for the app

	Randomly assigned into treatment group?			Demand among treated - downloaded & used app?		
	Yes	No	Difference	Yes	No	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
Semester credits (for a grade)	12.505	12.843	-0.338	13.033	11.901	1.131
	(0.158)	(0.134)	(0.207)	(0.169)	(0.274)	(0.313)
Prior Pocket Points user	0.414	0.418	-0.003	0.528	0.284	0.244
	(0.022)	(0.022)	(0.031)	(0.031)	(0.030)	(0.043)
Pre-treatment survey questions:						
Female	0.620	0.610	0.010	0.707	0.450	0.258
	(0.022)	(0.022)	(0.31)	(0.028)	(0.033)	(0.043)
Years at TAMU	2.115	2.127	-0.013	2.053	2.185	-0.133
	(0.051)	(0.051)	(0.072)	(0.070)	(0.073)	(0.101)
Distracted by Phone During Class or Studying	0.618	0.598	0.019	0.615	0.621	-0.006
	(0.022)	(0.022)	(0.031)	(0.030)	(0.032)	(0.044)
Percent of Class Time Spent on Phone (6%+)	0.229	0.222	0.007	0.223	0.221	-0.002
	(0.019)	(0.019)	(0.027)	(0.026)	(0.027)	(0.038)
Issues with Procrastination	0.795	0.765	0.030	0.774	0.819	-0.045
	(0.018)	(0.019)	(0.026)	(0.026)	(0.025)	(0.036)
Issues with Committing to Goals	0.479	0.410	0.069	0.468	0.491	-0.023
	(0.022)	(0.022)	(0.031)	(0.030)	(0.033)	(0.045)
Pulled an All-nighter in previous semester	0.126	0.122	0.004	0.141	0.102	-0.039
	(0.018)	(0.018)	(0.026)	(0.027)	(0.024)	(0.037)
Impatience	0.135	0.155	-0.020	0.106	0.168	-0.062
	(0.015)	(0.016)	(0.022)	(0.019)	(0.025)	(0.031)
Present Bias Preferences	0.068	0.082	-0.013	0.053	0.086	-0.033
	(0.011)	(0.012)	(0.017)	(0.014)	(0.018)	(0.027)
Observations	497	503	1,000	265	232	497
F-statistic [p-value]			0.72			7.91
			[0.721]			[0.000]

Notes: Standard errors presented in parentheses. F-statistics and p-values for joint significance of all individual covariates included. "Pulled an All-nighter" variable drops freshmen since this was their first semester. All variables (except "Years at TAMU" and "Semester Credits") are dummy variables. See Appendix A.2 for a complete list of Baseline Survey questions.

Table 2: Impacts of encouragement on app usage and End-of-Semester Survey completion

	Completed survey	Downloaded app		Used app at least once		Used app > once a week
	(1)	(2)	(3)	(4)	(5)	(6)
Encouragement treatment	0.044	0.196	0.247	0.251	0.311	0.130
	(0.028)	(0.025)	(0.029)	(0.028)	(0.033)	(0.031)
Control mean	0.700	0.467	0.483	0.284	0.290	0.168
Observations	1000	1000	724	1000	724	724
Sample	Full	Full	Survey	Full	Survey	Survey

Notes: Standard errors presented in parentheses. Each cell corresponds to a single regression. Each outcome is a dummy variable, presented in the column header. Observations are unique at the student level. See text for description of full set of control variables. "Downloaded app" is an indicator variable takes the value of 1 if the student downloaded the app and created an account. This data is obtained from the Pocket Points company. "Used app at least once" is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is also obtained from the Pocket Points company. "Used app > once a week" is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester Survey. "Full" sample includes all participants who signed up for the experiment. "Survey" sample includes all participants who completed the End-of-Semester Survey at the end of the semester.

Table 3: Main results for classroom survey outcomes

	Reduced form	IV w/ encouragement treatment	
	(1)	(2)	(3)
Outcome: Phone distraction in class (z-score)			
Encouragement treatment	-0.131		
	(0.064)		
Used app at least once		-0.421	
		(0.205)	
Used app $>$ once a week			-1.011
			(0.537)
Outcome: Attended all classes			
Encouragement treatment	0.045		
	(0.030)		
Used app at least once		0.145	
		(0.096)	
Used app $>$ once a week			0.348
			(0.243)
Outcome: Satisfied w/ performance (z-score)			
Encouragement treatment	0.138		
	(0.072)		
Used app at least once		0.444	
		(0.232)	
Used app $>$ once a week			1.065
			(0.589)
First Stage F-statistic		88.033	17.422
Observations	724	724	724

Notes: Standard errors presented in parentheses. Each cell corresponds to a single regression. Observations are unique at the student level. See text for description of full set of control variables. "Used app at least once" is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is obtained from the Pocket Points company. "Used app $>$ once a week" is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester Survey. "Attended all classes" is an indicator variable for whether the student attended all of their classes during the semester. The exact wording for the "Phone Distraction in class" question was "(For the semester) On a scale from 1 (not very often) to 5 (very often), how often did you get distracted by your phone or laptop when in lectures, discussion sections, and labs?" The exact wording for the "Satisfied w/ performance" question was "On a scale from 1 (not very satisfied) to 5 (very satisfied), how satisfied are you with your performance in your classes this past semester?" "Phone Distraction in class" and "Satisfied w/ performance" variables are standardized (subtracted sample mean and divided by standard deviation). Control means for "Phone distraction in class (z-score)," "Attended all classes," and "Satisfied w/ academic performance (z-score)" are 0.080, 0.196, and -0.038, respectively.

Table 4: Substitution in hours spent on studying

	Reduced form	IV w/ encouragement treatment	
	(1)	(2)	(3)
Outcome: Hours/week spent on campus			
Encouragement treatment	-0.731		
	(1.743)		
Used app at least once		-2.349	
		(5.483)	
Used app $>$ once a week			-5.635
			(13.201)
Outcome: Hours/week studying			
Encouragement treatment	-1.540		
	(1.129)		
Used app at least once		-4.949	
		(3.575)	
Used app $>$ once a week			-11.871
			(9.014)
Outcome: Hours/week studying on campus			
Encouragement treatment	-2.110		
	(1.049)		
Used app at least once		-6.782	
		(3.353)	
Used app $>$ once a week			-16.268
			(8.881)
First Stage F-statistic		88.033	17.422
Observations	724	724	724

Notes: Standard errors presented in parentheses. Each cell corresponds to a single regression. Observations are unique at the student level. See text for description of full set of control variables. "Used app at least once" is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is also obtained from the Pocket Points company. "Used app $>$ once a week" is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester Survey. The outcome variables in each panel are also self-reported and come from the End-of-Semester Survey. Control means for "Hours/week spent on campus," "Hours/week studying," and "Hours/week studying on campus" are 31.458, 20.304, and 14.114, respectively.

Table 5: Main results for transcript grades

	Reduced form		IV w/ encouragement treatment		
	(1)	(2)	(3)	(4)	(5)
Outcome: Grade point average					
Encouragement treatment	0.049	0.065			
	(0.040)	(0.046)			
Used app at least once			0.195	0.208	
			(0.161)	(0.148)	
Used app > once a week					0.500
					(0.374)
First Stage F-statistic			79.575	88.033	17.422
Observations	1000	724	1000	724	724
Sample	Full	Survey	Full	Survey	Survey

Notes: Standard errors presented in parentheses. Each cell corresponds to a single regression. Observations are unique at the student level. See text for description of full set of control variables. "Used app at least once" is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is also obtained from the Pocket Points company. "Used app > once a week" is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester Survey. "Grade Point Average" is the semester GPA which is calculated using the course grades obtained from the registrar's office. "Full" sample includes all participants who signed up for the experiment. "Survey" sample includes all participants who completed the End-of-Semester Survey at the end of the semester. Control means for Grade point average are 3.242 (for the full sample) and 3.274 (for the survey subsample).

Table 6: Robustness Check: Classroom Outcomes and Time Spent Studying Indices

	Reduced form	IV w/ encouragement treatment	
	(1)	(2)	(3)
Outcome: Index for Classroom Outcomes			
Encouragement treatment	0.120		
	(0.043)		
Used app at least once		0.385	
		(0.141)	
Used app > once a week			0.924
			(0.391)
Outcome: Index for Time Spent Studying			
Encouragement treatment	-0.122		
	(0.068)		
Used app at least once		-0.392	
		(0.217)	
Used app > once a week			-0.941
			(0.566)
First Stage F-statistic		88.033	17.422
Observations	724	724	724

Notes: Standard errors presented in parentheses. Each cell corresponds to a single regression. Observations are unique at the student level. The control variables used in these regressions are the same as Tables 3 and 4. "Used app at least once" is an indicator variable takes the value of 1 if the student used the app at least once during the course of the treatment semester. This data is also obtained from the Pocket Points company. "Used app > once a week" is an indicator variable that takes the value of 1 if the student used the app more than once a week. This self-reported data comes from the End-of-Semester Survey. Index for Classroom Outcomes is constructed using the following variables: Phone distraction in class (reverse coded), attended all classes, satisfied with performance, term GPA. These variables are first normalized using min-max scaling to a range between 0 and 1 and then standardized. This index is the average of these four standardized variables. Index for Time Spent Studying is the average of the following standardized variables: Hours/week studying and Hours/week studying on campus.

Online Appendix

Appendix A.1 - Additional Tables and Figures

Table A1: Summary Statistics for Outcome Variables

	Randomly assigned into treatment group?	
	Yes	No
	(1)	(2)
Phone distraction in class	2.465	2.656
	(1.136)	(1.309)
Attended all classes	0.229	0.196
	(0.420)	(0.398)
Satisfied w/ performance	3.551	3.460
	(1.229)	(1.212)
Hours/week spent on campus	31.323	31.458
	(23.547)	(24.693)
Hours/week studying	18.237	20.304
	(14.266)	(16.034)
Hours/week studying on campus	11.999	14.114
	(12.668)	(16.718)
Term GPA	3.256	3.242
	(0.663)	(0.672)
Observations	372 - 497	352 - 503

Notes: Standard deviations presented in parentheses. This table provides the sample averages for the main outcome variables used in the paper. See main tables and text in the paper for a description of each variable. The number of observations are 372 in the treatment group and 352 in the control group for all survey measures which were collected as part of the End-of-Semester Survey. Since Term GPA data was obtained from the registrar's office, we have the full sample of 497 and 503 for that variable.

Figure A1: Screenshots from Pocket Points app

Source: pocketpoints.com, retrieved August 27, 2023. *Note*: Actual user interface differed during time frame of experiment.

Appendix A.2 - Experimental Materials

Sign-Up Sheet

Howdy Texas A&M Students,

A team of researchers are excited to offer you an opportunity to participate in "Project Smartphones and Smarter Aggies", which is an online study where you can enter a drawing to be one of the 12 recipients of $100 by completing the following three simple steps. Participating in "Project Smartphones and Smarter Aggies" is very easy, and in total, will take about 15 minutes of your time. Here is how the study works:

1. Sign up for the study by completing the sign-up sheet. This should take only about five minutes. You have until September 10 to sign up. Hurry and sign up today!

2. Shortly after September 10, you will receive an email from billuraksoy@tamu.edu. We may

ask you to download and create an account for an app on your phone. The app will be completely free, and you will not be required to use the app at all. In fact, after creating an account, you may simply delete the app from your phone, if you desire. However, you may find the app to be useful.
3. At the end of the semester, look out for another email from billuraksoy@tamu.edu that will include a link to a short survey which will take about 10 minutes.

That's all it takes to be eligible to enter the drawing and to have the chance to be one of the 12 recipients of $100. The drawing will be conducted at the end of the semester, and if you are selected as one of the recipients, we will get in touch with you to make a payment using your most preferred method (cash, Venmo, PayPal, and so on).

All undergraduate students and Texas A&M University are invited to participate, regardless of discipline.

If you have any questions, feel free to email us at billuraksoy@tamu.edu. We look forward to seeing you participate in this easy yet amazing opportunity!

Best regards,

Billur Aksoy
PhD candidate, Department of Economics, TAMU
E-mail: billuraksoy@tamu.edu

Baseline Survey questions:

- What is your email address?
- What is your first name?
- What is your last name?
- What is your UIN? (9-digit number on your student ID)
- What is your UIN? Please type in again.
- When is your birthday?
- What gender do you identify as? [Male, Female, Prefer not to say, Other]
- What year are you? [Freshman, Sophomore, Junior, Senior, Graduate]
- Approximately how many times during a typical class do you check your smartphone? [0-1 times, 2-4 times, 5+ times, I do not own a smartphone]
- Approximately what percentage of class time do you spend checking your smartphone? [0%, 1-5%, 6-20% ,21+%, I do not own a smartphone]

- Approximately how many lectures/labs do you miss or skip every week? [This is my first semester at Texas A&M, 0-1, 2-4, 5+]
- To what extent do you agree or disagree with this statement: ”I often get distracted by my cellphone when studying or sitting in class.” [Very much agree, Slightly agree, Slightly disagree, Very much disagree]
- To what extent do you agree or disagree with this statement: ”I have issues with procrastination when studying or completing assignments.” [Very much agree, Slightly agree, Slightly disagree, Very much disagree]
- To what extent do you agree or disagree with this statement: ”I have issues with committing to my goals (e.g. exercising, smoking cessation, achieving academically).” [Very much agree, Slightly agree, Slightly disagree, Very much disagree]
- How many times in the last semester have you pulled an ”all-nighter” (i.e. gone a whole night and morning without sleeping) for school-related purposes? [This is my first semester at Texas A&M, 0 times, 1-3 times, 4-7 times, 8+ times]
- Which of the following would you rather have? [$100 transferred to your bank account instantaneously, $105 transferred to your bank account in 7 days,]
- Which of the following would you rather have? [$100 transferred to your bank account in 365 days, $105 transferred to your bank account in 372 days]
- Which of the following apps do you currently have downloaded on your phone? [Facebook, YouTube, DropBox, WhatsApp, Pocket Points, Line, Yelp, CNN, Spotify, Pandora, Snapchat, Skype, Skyscanner, Instagram, Venmo, PayPal, Groupon, AirBnB, Etsy, Flixter, ESPN, Twitter, Starbucks, Audible, Finish, I do not own a smartphone, I do not have any of the above apps on my smartphone]

[CONSENT FORM]

I read the above statement and I give my consent to participate in this study.

Treatment (Nudge) Email

Howdy participants,

You recently signed up for our study "PROJECT SMARTPHONES & SMARTER AGGIES"! Remember that by completing the study, you will be entered into a drawing to win one of twelve $100 cash prizes. Please read this email very carefully as it contains important information.

To complete the second stage of this study, you will have to download and create an account for the mobile application Pocket Points. Pocket Points is an app that gives students rewards for not using their phones during class. Students who use Pocket Points open the app on campus, stop using their phone, and start gaining points. Points are then used at local and online businesses for discounts and coupons.

If you already have an account: please click the following link to provide information about your account so that we can confirm that you completed the second stage of the study:

(Please sign in to google with your TAMU email)

[LINK]

If you do not have an account: You must 1) download Pocket Points on your smartphone, and 2) create an account on Pocket Points using your Texas A&M email address. Instructions to download and sign up can be found on www.pocketpoints.com. The app is completely free, and you are not required to use the app at all; in fact, after creating an account, you may simply delete the app from your smartphone, if you desire. We will verify with Pocket Points whether you successfully created the account with your Texas A&M email address.

At the end of the semester, we will email you with a survey to complete to close out the study. That's it! We will also provide instructions on how you can receive your earnings if you are selected as one of the recipients of the cash prize.

You are not required to respond to this email. However, if you have any questions or concerns, please do not hesitate to get in touch with me.

Best regards,

[SIGNATURE]

Control Email

Howdy participants,

You recently signed up for our study "PROJECT SMARTPHONES & SMARTER AGGIES"! Remember that by completing the study, you will be entered into a drawing to win one of twelve $100 cash prizes.

There is no action required at this time. To complete the study, all you will have to do is to complete a survey that we will send at the end of the semester. We will also provide instructions on how you

can receive your earnings if you are selected as one of the recipients of the cash prize.
You are not required to respond to this email. However, if you have any questions or concerns, please do not hesitate to get in touch with me.
Best regards,
[SIGNATURE]

End-of-Semester Survey

Dear participants,
Congratulations! You have reached the final stage of Project Smartphones and Smarter Aggies. You signed up to be a part of our study at the beginning of the Fall 2017 semester, and upon completion of the following survey which should take no longer than five minutes, you will enter a drawing to be one of the twelve recipients of $100. You have until Friday 12/22/2017 to complete this short survey. It takes only 5 minutes, go ahead and complete now. To complete your participation in this study, please click the link below. Please notice that this study is open to TAMU students only thus you will have to be logged into google with your TAMU email.

[insert link]

Thank you for your participation and we hope you enjoy your winter break! If you have any questions, please feel free to email me back here.
Best Regards,
[SIGNATURE]
End-of-Semester Survey questions:

- What is your UIN? (9-digit number on your student ID)
- What is your first name?
- What is your last name?
- Compared to your previous semesters, how difficult were your courses this past semester? [Less than average difficulty, average difficulty, more than average difficulty, N/A (first semester at TAMU)]
- How many final examinations did you have this past semester?
- Approximately how many hours did you spend on campus every week this past semester for academic-related purposes (e.g. class attendance, visiting office hours, studying)?
- Approximately how many hours did you spend studying every week this past semester?

- Approximately how many hours did you spend studying on campus every week this past semester?
- Approximately how many hours did you spend studying at home every week this past semester?
- Approximately many hours of lectures, discussion sections, and labs did you MISS/SKIP this past semester?
- On a scale from 1 (not very often) to 5 (very often), how often did you get distracted by your phone or laptop when trying to study or do school work?
- On a scale from 1 (not very often) to 5 (very often), how often did you get distracted by your phone or laptop when in lectures, discussion sections, and labs?
- Agree or disagree: "On average, I found myself using my cellphone more than once a week during lectures, discussion sections, and labs this past semester, to do things such as check my email, go on Facebook, and browse the web."
- Agree or disagree: "This past semester, I feel like social media distracted me from studying as much as I wanted to."
- On a scale from 1 (not very satisfied) to 5 (very satisfied), how satisfied are you with your performance in your classes this past semester?
- Which of the following apps did you use at least once during this past semester? [Facebook, YouTube, DropBox, WhatsApp, Pocket Points, Line, Yelp, CNN, Spotify, Pandora, Snapchat, Skype, Skyscanner, Instagram, Venmo, PayPal, Groupon, AirBnB, Etsy, Flixter, ESPN, Twitter, Starbucks, Audible, Finish, I do not own a smartphone, I do not have any of the above apps on my smartphone]
- Which of the following apps did you use approximately more than once a week during this past semester? [Facebook, YouTube, DropBox, WhatsApp, Pocket Points, Line, Yelp, CNN, Spotify, Pandora, Snapchat, Skype, Skyscanner, Instagram, Venmo, PayPal, Groupon, AirBnB, Etsy, Flixter, ESPN, Twitter, Starbucks, Audible, Finish, I do not own a smartphone, I do not have any of the above apps on my smartphone]