

# The Effect of Nudging on the Utilization of Counseling Services and the Implications on College Student Involvement

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## Abstract

The rising suicide rate among adolescents in the US has created the need for an intervention that can improve outreach activities and increase the utilization of mental health services. In this study, I ran a randomized control trial involving nudging to establish a pro-counseling social norm and to increase on-campus mental health services utilization through Student Health Services at the University of South Carolina. To implement my design, I sent campus-wide emails to inform students of the mental health services offered on campus. Randomly selected students received either a simple informative message or a nudging message that both presented the mental health services available on campus. Additionally, the nudging message included a highlighted social norm statement. Within each group, randomly selected students received the message either once or twice during the semester. Findings indicate that the effectiveness of the nudge varied by race. The second nudging email was more effective for White students who were already utilizing counseling, increasing their number of counseling visits by 18% from the average level. However, for Black students, the first nudge successfully increased their probability of going to counseling by 51% relative to the average. Similarly, for Asian students, the first nudging email increased the probability of visiting a mental health service by 52% relative to the mean level. Furthermore, nudging increased the probability of Black students going to a social on-campus event by 22% relative to the mean, unveiling synergies between receiving help and student involvement. These results suggest that the efficiency of nudging may depend on stigma or other pragmatic barriers that are more prevalent among minorities.

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# 1 Introduction

According to the Centers for Disease Control and Prevention (CDC), suicide is the second leading cause of death for adolescents aged 15 to 24 years.<sup>1</sup> Using 3-year averages from 2007–2009 to 2016–2018, CDC reports that suicide rates in the United States increased by 47.1%, with South Carolina experiencing an increase of 56%.<sup>2</sup> The Substance Abuse and Mental Health Services Administration (SAMHSA) reported that in 2019 11.5% of young adults between 18 and 25 years old had serious thoughts of suicide, 3.9% planned suicide, and 1.8% attempted suicide.<sup>3</sup> In the same year, the American College Health Association–National College Health Assessment (ACHA-NCHA) surveyed 38,679 students from 58 colleges and found that 21.6% of students felt moderate and 19.5% felt serious psychological distress.<sup>4</sup> At the University of South Carolina (UofSC), 10% of surveyed students seriously considered suicide, 6% intentionally caused harm to themselves, and 1.3% attempted suicide within a 12-month period.<sup>5</sup> These statistics clearly demonstrate the imperative need for accessible mental health services in colleges.

Despite this need for mental health care, the rate of treatment is relatively low at UofSC compared to the national average of colleges. In the 2019 ACHA-NCHA survey, 25.4% of students responded that they received psychological or mental health support within the past 12 months, with the majority going to the on-campus health and/or counseling center.<sup>6</sup> ? analyzed data from the Healthy Minds Study, conducted across 196 campuses in the US, and found that the rate of treatment increased from 2007 to 2017<sup>7</sup> and, during the 2016-2017

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<sup>1</sup>NCHS Data Brief No. 352, October 2019.

<sup>2</sup>National Vital Statistics Reports, Vol. 69, No. 11, September 11, 2020.

<sup>3</sup>2019 National Survey of Drug Use and Health (NSDUH) Releases.

<sup>4</sup>American College Health Association–National College Health Assessment, Undergraduate Student Reference Group, Executive Summary, Fall 2019, p.13

<sup>5</sup>See the ACHA-NCHA (2017) survey for UofSC. For reference, UofSC is a public research urban university located at the capital of the state of South Carolina in Columbia. It has over 36,000 students with more than 26,000 undergraduate students.

<sup>6</sup>American College Health Association–National College Health Assessment, Undergraduate Student Reference Group, Executive Summary, Fall 2019, p.5

<sup>7</sup>Other studies like ?, ? ? and ? have also looked at utilization and calculated lower rates of treatment but their data are not as recent.

academic year, the rate of treatment was 34%.<sup>8</sup> However, during the fall semester of 2019 at UofSC, less than 9% of students visited an on-campus mental health service (including counseling, psychiatry, group counseling, and coaching), and the majority of them visited the service only once.

Students may not utilize college mental health services for various reasons. ? found that students at heightened risk tend to not go to counseling primarily because they do not think it is necessary, are busy, and think they can manage by themselves. Other reasons mentioned, in order of frequency, were as follows: they were seeking help from their family and friends; pragmatic barriers to accessing services, such as long waiting periods; financial concerns; not knowing where to go; stigma; doubt that professional help would be beneficial; and negative past experiences with professional help. Summarizing 146 relevant papers, ? added that help-negation and fear of hospitalization are two more reasons why individuals with acute suicidal ideation may avoid seeking help. When designing the mechanism for this paper, I considered these barriers to access and gathered anecdotal evidence from discussion with Student Health Services (SHS) officials about the mental health culture at UofSC.

Many studies on reasons for low-utilization of mental health services have underestimated the effect of stigma on seeking help. As ? explained, researchers used to ask individuals if they would think less of a person for seeking mental health treatment, and since the respondents knew that stigmatization is not socially acceptable, their answers were potentially biased. ? found that stigma has decreased from 2007 to 2017; yet in the 2016-2017 academic year, 46% of college students still believed that others think less of a person who has received mental health treatment. Officials at UofSC have raised concerns about stigmatization on campus, relying on studies like ? that suggested that stigma may be more prevalent in the US South than in other parts of the country.<sup>9</sup> From anecdotal evidence, stigma seems to

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<sup>8</sup>Although the Healthy Minds Study is a statewide study, its response rate has been declining throughout the years. For reference, the response rate in the 2016-2017 academic year was 23%. This may have caused an overestimation of the rate of treatment since students who were utilizing the services may have also been more inclined to answer to the survey.

<sup>9</sup>Stigma is a big concern for students, faculty and staff. UofSC's student government tried to reduce stigmatization by organizing events such as the "Stigma Free USC" week in 2018.

be partially driven by students’ fear of admitting their failure to enjoy student life or “the best years of their lives.” Promoting services within a pro-counseling social framework—a university culture that embraces seeking help—may help combat stigma, decrease barriers to treatment, increase awareness of services, and encourage utilization.

Racial and ethnic minorities tend to underutilize mental health services due to greater barriers and stigma. Several studies have found that Black, Asian, and Hispanic college students seek mental health treatment less often, schedule less follow-up appointments, and report more barriers to treatment compared to White students (?, ?, ? and ?). Financial concerns and lack of time were the most common barriers to treatment in these studies and minorities reported stigma-related concerns more often than their White peers. ? found that Black and Asian students showed less favorable attitudes on a variety of help-seeking attitudes. ? and ? agreed that outreach efforts should seek to remove barriers to treatment and improve utilization of mental health services for racial and ethnic minorities on campus. In this study, nudging affected minority students the most. This could be because nudging lowered the perception of pragmatic barriers and/or stigma on campus.

While extensive literature exists on the rate of treatment and barriers to treatment, there have been few published peer-reviewed papers on interventions that increase utilization of services (?). Most proposed interventions involve communication efforts, psychoeducation interventions, peer training, gatekeeper training, and screening.<sup>10</sup> Several of the existing studies on interventions have suffered from three issues: low survey response rates; failure to connect interventions to post-intervention behavior; and lack of randomization, which can induce estimation bias.<sup>11</sup> The intervention I designed in partnership with SHS at UofSC tackled all of these issues: it did not rely on student response rates, measured actual behavior post-treatment, and was randomized.

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<sup>10</sup>For communication interventions see papers like ?, for psychoeducation interventions see ?, ?, ?, ?, ? and ?, for peer training interventions see ? and ?, for gatekeeper training see papers like ? and for screening see papers like ?, ? and ?. For interventions specifically about stigma see ?.

<sup>11</sup>?, ?) had low response rates. ?, ?) failed to connect interventions to post-intervention behavior. ?, ? and ? did not randomize treatment.

I based my randomized control trial on nudging, a technique popularized by ?, which I used to test whether suggesting a positive norm affects the utilization of services. Nudging, often a cost-and time-effective technique, alters the choice architecture of subjects with the objective of more desirable decision making. I specifically employed social norm nudging, one of the various forms of nudging. There are two kinds of social norms: descriptive and injunctive. Descriptive norms represent the perception of what others do and injunctive norms represent what others approve or disapprove of. I used a descriptive norm nudge based on data from UofSC's NCHA (2019) and the Healthy Minds Study (2018). I first presented the students receiving a nudging email with the descriptive norm nudging statement—that claims most of their classmates would consider help if needed, and most would consider that help effective—before providing a description of on-campus mental health service options.

The nudge can increase the utilization of services for three reasons. First, according to the long-standing psychology literature, informing students of the majority behavior instigates imitation of and conformity to this majority behavior.<sup>12</sup> As ? suggested, subjects' preferences depend on the framing of the problem. In this study, the norm nudging statement framed the student's own choice to seek mental health care within the idea that the majority of other students would seek help if needed. Second, the nudging statement highlighted that the utilization of services has been proven effective for the majority of students. Third, the nudging statement aimed to establish a pro-counseling social norm countering possible mental health services stigma on campus. If the majority of students would consider seeking help, then presumably the same majority would not think less of others that do so. Along the same lines, the nudging statement suggested that therapists must be accustomed to students admitting their need for support.

Norm nudging has been widely used in a variety of field experiments: studies on reducing littering, tax evasion, timely payment of loans, increasing voluntary provision of public goods, charitable giving, energy conservation, improving food choices, moderating prescription of

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<sup>12</sup>See for example ?.

antibiotics and preventing gender-based violence.<sup>13</sup> In college studies, norm nudging has been used in the context of food choices, college drinking, fee collection and suicide prevention.<sup>14</sup> I extend research done by ?, in which the authors measured whether students who received an email with a nudge clicked more times on links embedded in the email than students who received the same email but without the nudge. The links in the study guided students to participate in a free online mental health intervention and listed mental health resources. Bauer et al. found that the links in the nudging email were clicked 67% more times than the links in the basic email without the nudge. Building on ?, my study—to the best of my knowledge—is the first to follow students post-treatment to look at their use of services. I also investigated the effect of the nudge on student involvement as a predictor of students’ sense of belonging.

Student involvement has been linked to better mental health, greater sense of belonging, improved academic outcomes, and higher retention.<sup>15</sup> I measure students’ involvement by their attendance of social events, visits to the wellness and fitness center, and participation in student organizations. Attendance of social events and participation in student organizations aim to capture social inclusion, while visits to the wellness and fitness center aim to capture students’ care for their physical health. Positive effects of nudging on any of these measurement would suggest that there are positive synergies between receiving mental health care and involvement that can further promote better mental health.<sup>16</sup>

While most papers that implement nudging find a positive and significant change in behavior, several studies have not been successful.<sup>17</sup> Regarding these unsuccessful studies, ? suggest that designing a successful nudge requires understanding what motivates certain

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<sup>13</sup>For papers regarding nudging and littering see ?, tax evasion see ? and ?, timely payment of loans see ?, voluntary provision of public goods see ?, charitable giving see ?, energy conservation see ?, recycling see ?, ?, ? and ?, a review of improving food choices see ?, prescription of antibiotics see ? and for gender-based violence see ?.

<sup>14</sup>For papers regarding nudging in college and its effects on food choices see papers like ?), on college drinking see ?, and ?, on fee collection see ? and on suicide prevention see ?

<sup>15</sup>See for example ?, ?, ? ?, ?, ?.

<sup>16</sup>See for example ?.

<sup>17</sup>See for example ?, ?, ?, ?, ?, ? ?. See also ? for a review on the effectiveness of nudges.

choices. In the following section, I discuss how I incorporated several of their observations in designing the nudging statement.

## **2 Experiment**

### **2.1 Data Collection**

I partnered with the SHS, the Communications and Public Affairs office and the department of Student Life at UofSC in the fall of 2019 to email the entire undergraduate student body that consisted of 26,570 students. Prior to the experiment, I received a de-identified database, with students' basic demographic characteristics to randomize students into 4 treatment groups. The experiment was conducted in two rounds: at the first third of the semester and at the second third of the semester. Within those rounds students either received a basic information email or a nudging email. At the end of the semester, I received an administrative data set with the student demographics, the number of counseling, psychiatry, group therapy and coaching sessions, an indicator of whether students participated in a student organization, the number of visits to the wellness and fitness center and the number of social events students attended after the first and second round of the experiment.

### **2.2 Design**

The objective was to create two emails: a basic information email and a nudging email. The basic information email had to include details on the services offered on campus and instructions on how to schedule appointments. The nudging email included the same information along with a highlighted descriptive social norm statement in the very first line (see figures ?? and ??). The only difference between the basic information email and the nudging email was that the nudging email included a descriptive social norm statement that read “83% of students at UofSC would consider seeking help if a personal problem was bothering them, and almost 90% of students at UofSC who have sought help for their mental or emotional

health found it helpful.”

According to ?, the social norm statement should be designed very carefully to maximize its effectiveness. Individuals prefer to conform to a social norm if they think that the majority in their reference network conforms to it and believes that the individuals ought to conform to it, too. To make sure, students believed the social norm statement used in this paper, I included information from the NCHA (2019) and the Healthy Minds Study (2018) and I listed these sources in the actual email. From these two surveys, I picked the most positive statements to instigate positive behavioral change. Nowadays it is common belief that mental health treatment is beneficial, especially among younger generations, hence, students could perceive seeking help as a positive behavioral decision. To make sure that the messenger is trusted, UofSC’s logo was prominently placed and the emails were sent through the Communications Office of UofSC, following the guidelines used for other massive campus-wide communication efforts. According to ?, it is also important to refer to a specific reference network in the statement instead of using vague expressions. Therefore, I used UofSC students as the point of reference.

? also explained that empirical messages may be ineffective if the information provided is not aligned with subjects’ beliefs. While I could not control students’ beliefs, the nudging statement I used refers to a high percentage of students who “consider seeking help” which is more convincing compared to a high percentage of students who actually seek help, which in reality is low. Then, the statement continues referring to those who “have sought help”. Since most students do not seek help it might be harder to have firm beliefs about the usefulness of the services if they have never tried them before. Racial minority students may have stronger beliefs against both statements. If that is the case, the effectiveness of nudging for racial minorities could be lower compared to White students and compared to what it could be if they trusted that the statement is valid.

Undergraduate students were evenly allocated into 4 groups: the “Info”, the “Info x 2”, the “Nudge” and the “Nudge x 2” groups. The “Info” group received the basic information



email only on September 24th of 2019. The “Info x 2” group received the basic information on September 24th and October 29th. The “Nudge” group received the nudging email only on September 24th of 2019. The “Nudge x 2” group received the nudging email on September 24th and October 29th. I refer to the September 24th emails as the first round of emails and to the October 29th as the second round of emails.<sup>18</sup> Although there is mixed evidence on the long-term effects of nudging,<sup>19</sup> Treatment was repeated in an effort to examine whether nudging is more or less effective at a time when students were busier, which is a common reason used to avoid seeking help (?).<sup>20</sup> The number of counseling, psychiatry, coaching, group therapy visits, social event attendance and visits to the wellness and fitness center were counted from September 25th to October 29th for the first round and from October 30th to December 4th for the second round.<sup>21,22</sup>

The randomization of students into 4 groups was completed using block randomization. Block randomization uses variables that predict the outcome to distribute subjects of similar characteristics in the 4 treatment groups. Blocking on prognostic covariates helped improve the precision with which treatment effects were estimated.<sup>23</sup> It also eliminates correlation between the assigned treatment and the variables used to form blocks. With the randomization in blocks, I avoided any rogue randomizations and ensured that different subgroups would be available for the analysis. According to SHS officials’ observations and perceptions as well as previous literature, the covariates that were most possibly strong predictors of the utilization of counseling were sex, race, ethnicity and class. They were also suspecting

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<sup>18</sup>In other words, in the first round, the ‘Info’ and ‘Info x 2’ groups received the basic information email and the ‘Nudge’ and ‘Nudge x 2’ groups received the nudging email. In round 2, only ‘Info x 2’ received the basic information email and ‘Nudge x 2’ received the nudging email.

<sup>19</sup>See for example ?, ?, ?.

<sup>20</sup>UofSC is in a semester system with two 15-week terms: fall and spring of each year. In the fall of 2019 classes started on August 16 and ended on December 6th. Students tend to be busier around the time of the second round of emails as this is around midterms and class projects due dates.

<sup>21</sup>This timeline was chosen to ensure that students were not identified in the data.

<sup>22</sup>The study was reviewed and approved by the institutional review board (IRB) at UofSC.

<sup>23</sup>Blocking is typically used to improve precision especially when the sample size is small. The sample size of all students was relatively large in this paper but the sample of minorities was much smaller. Even when the sample size was large, the average treatment effect was expected to be very small because very few students go to counseling so added precision could help in detecting a significant effect.

that honors students may be utilizing counseling more than non-honors students. For that reason, I used sex, race, ethnicity and class as blocks and randomized treatment 1,000 times, picking the randomization that balanced sex, race, ethnicity, class and honors status best.<sup>24</sup>

The biggest concern with this intervention was whether students were actually going to read the emails sent. For that reason, I embedded links on the emails which I tracked to count the number of clicks.<sup>25</sup> The number of clicks was indicative of the number of students who reacted to reading the e-mails. In the first round, the three links in the basic information email were clicked 2,768 times on average and the links on the nudging email were clicked 4,182 times on average. Hence, in the first round the links on the nudging email were clicked 51% more. In the second round, the three links in the basic information email were clicked 5,286 times on average and the links on the nudging email were clicked 5,910 times on average. Hence, in the second round the links on the nudging email were clicked 12% more. It is interesting to note that the links in the first round of emails were clicked less although they were sent to twice the amount of students the second round of emails were sent to. That could be because students typically receive more emails in the beginning of the semester which could lower their attention in each individual email. However, this difference could also be explained by the lower stress levels students have in the beginning of the semester compared to the middle of the semester. Also, the difference in clicks in the first round between the treatment and the control groups was much more stark which could indicate greater success in the first than the second round.

? found that their links in the nudging emails were clicked 67% more (n=57 vs 34). This was a slightly higher percentage than this paper's percentage from the first round. ? did not run their experiment a second time to be able to compare their findings with this paper's second round findings. Their subject pool consisted of 14,792 students, which was 44% smaller than mine. However, the number of clicks in ? was about 99% lower for both

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<sup>24</sup>If I were to use honors status as a block variable, some of the blocks would have had very few observations to allocate in the four treatment groups.

<sup>25</sup>I was not able to link the clicks to the students who clicked them but I could count the number of unique clicks.

the basic email and the nudging email, compared to the number of clicks (of the first round) in the emails of this study. Although the percentage difference between the clicks on the nudging email and the basic email was slightly higher for ?, the level of engagement was higher in this study. ? sent their emails mid-September during Suicide Prevention Week and although mine were sent around the same time (on September 24th) there was no overlap with other interventions. Thus, it is possible that the effectiveness of emails was crowded out by all of the other communication efforts happening at Suicide Prevention Week in the ? study.

### 3 Model

In order to find the effect of the nudge on the utilization of services I estimated a two-part “Hurdle” model. This model was used to reflect a two-stage decision-making process and estimate the intensive and extensive margin of nudging. The decision mechanism behind initiating a first visit can be very different than the decision mechanism behind scheduling the second and subsequent visits. The first visit at the mental health services at SHS was a triage appointment (coded as a counseling visit) that determines the needs of a student. Subsequent visits are typically scheduled if both the therapist and the student find a need to continue. After the first triage appointment, the therapist could also advise the student to use a different service such as psychiatry, group counseling or coaching. Thus, I estimated separately the effect of the nudge on the probability of going to counseling and on the number of visits for the students who were already going to counseling (see equation (??)).

$$g(Visits) = \begin{cases} f_1(0) & \text{if } Visits = 0 \\ \frac{1-f_1(0)}{1-f_2(0)} \cdot f_2(Visits) & \text{if } Visits > 0 \end{cases} \quad (1)$$

Equation (??) is the mathematical expression of the Hurdle model where the zeroes are determined by density  $f_1(.)$  and the positive counts are determined by density  $f_2(.)$ . The

binary model was estimated using a Logit estimation and the positive counts model was estimated using a Poisson estimation.<sup>26</sup>

In the first round, the “Info” and “Info x 2” groups received the same basic information email and the “Nudge” and “Nudge x 2” groups received the same nudging email. Hence, the coefficient of interest in the first round was the effect of the nudge on the probability of going to counseling and the number of visits for the students who already go to counseling. In the second round, only the “Info x 2” and “Nudge x 2” received the basic and the nudging email, respectively. The “Info” and “Nudge” groups did not receive any email. Thus, the coefficient of interest was the interaction term of being in the nudge group and of actually receiving the second email (the interaction of  $Nudge_1 \cdot Reminder_i$  with the  $\beta_3$  coefficient).

$$\text{In round 1: } x'_i\beta = \beta_0 + \beta_1 Nudge_i + \delta_i$$

$$\text{In round 2: } x'_i\beta = \beta_0 + \beta_1 Nudge_i + \beta_2 Reminder_i + \beta_3 Nudge_i \cdot Reminder_i + \delta_i$$

In order to find the effect of the nudge on involvement, I estimated a Logit model on the probability of going to a social event, to the wellness and fitness center and participating on a student organization (see equation (??)). In other words, a reduced form estimation was employed to investigate any synergies between the utilization of mental health services and student involvement on campus.

$$Involvement_i = \alpha_0 + \alpha_1 Nudge_i + \alpha X + \epsilon_i, \quad (2)$$

By choosing block randomization, I needed to weight each observation by the inverse of the proportion of subjects in its block who were assigned to each treatment group.<sup>27</sup> Express-

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<sup>26</sup>Results using a negative binomial model, instead of a Poisson, can be provided upon request. Estimates were robust to the application of a negative binomial model.

<sup>27</sup>See ? ch 4.5, p. 116-120. Each student in the “Info” group was weighted by the inverse of the proportion of subjects in their block who were assigned to the “Info” group. Similarly, each student in the “Infox2” group was weighted by the inverse of the proportion of subjects in their block who were assigned to the “Infox2” group. Each student in the “Nudge” group was weighted by the inverse of the proportion of subjects in their block who were assigned to the “Nudge” group and each student in the “Nudgex2” group was weighted by

sion (??) shows how weights were calculated. More specifically,  $i$  represents the individual;  $j$  the block;  $P$  the probability individual  $i$  in block  $j$  was assigned to I (the “Info” group),  $I \times 2$  (the “Info x 2” group) and N (the “Nudge group”);  $d_{Ii}$  is equal to 1 if subject  $i$  was assigned to the “Info” group;  $d_{I2i}$  is equal to 1 if subject  $i$  was assigned to the “Info x 2” group and  $d_{Ni}$  is equal to 1 if subject  $i$  was assigned to the “Nudge” group.

$$w_{ij} = \frac{1}{P_{Iij}}d_{Ii} + \frac{1}{P_{I2ij}}d_{I2i} + \frac{1}{P_{Nij}}d_{Ni} + \frac{1}{1 - P_{Iij} - P_{I2ij} - P_{Nij}}(1 - d_{Ii} - d_{I2i} - d_{Ni}) \quad (3)$$

The block randomization improves estimate precision if the variables used for creating the blocks are predictive of the outcome. Hence, I also estimated the effect of the block variables on the probability of utilizing the services and the number of visits for the students who used the services at least once. All estimations controlled for honors status.

For robustness, I compared effects with college fixed effects ( $\delta_i$ ). I also estimated the effect of the nudge on all visits, including counseling, psychiatry, coaching and group therapy. All tables include p-values calculated using randomization inference of 1,000 repetitions to verify the significance of the results. Using randomization inference, I also plotted the density distributions of the estimates for better visualization of how extreme the results were under the implemented randomization.

## 4 Descriptive Statistics

The undergraduate student population at UofSC in the fall of 2019 consisted of 26,570 students. The student body was made up of 54% females, about 80% White, 9% Black, 5% Asian, 4% mixed-race, 0.5% other race and 5% of Hispanic or Latino students. About 24% of students were freshmen, sophomores or juniors and about 28% were seniors.<sup>28</sup> 56% were in-state residents and 18% of students were in honors programs. In the first round of the study, 4.5% of students went to counseling at least once and 61% of them went only once.

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the inverse of the proportion of subjects in their block who were assigned to the “Nudex2” group.

<sup>28</sup>Classification was coded based on credit hours not cohort.

In the second round of the study, 4.6% of students went to counseling at least once and 69% of them went only once. In terms of involvement, less than 10% of students went to at least one on-campus social event, about a third of the undergraduate population visited at least once the wellness and fitness center and about 48% of students participated in a student organization.

In order to assess the validity of the randomization of students into the four treatment groups, Table ?? presents the summary statistics of student characteristics by treatment group. The first two columns include the average and standard deviation of students' characteristics in the "Info" group. The third and fourth columns include the average and standard deviation of students' characteristics in the "Info x 2" group. The fifth and sixth columns include the average and standard deviation of students' characteristics in the "Nudge" group. The last two columns include the average and standard deviation of students' characteristics in the "Nudge x 2" group. Overall, the averages and standard deviations were similar across the four groups.

To further test the randomization process, Table ?? displays the results from mean comparison tests across the four groups. I cannot reject the null hypothesis that the averages were equal in 94% of the comparisons.<sup>29</sup> There were statistically significant differences in only 5 comparisons: the average number of White students (columns (1) and (2)), the average number of mixed-race students (column (6)) and the average number of honors students (column (6)). Tests for the joint significance of all variables to explain the treatment group assignment fail to be rejected in all cases (see last row called "P-value joint significance"). Therefore, the implemented randomization was valid.

Graphically examining the effect of the nudge on the average number of counseling visits, Figure ?? plots the average number of counseling visits in the first round (Panel (a)) and in the second round (Panel (b)). In the first round, there was not any statistically significant difference in the average number of counseling visits between the groups that received the

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<sup>29</sup>Table ?? calculates 84 mean comparisons out of which only 5 were statistically significant. Hence, 79 out of 84 or 94% of the averages were similar.

basic information email and the nudging email. However, in the second round the average number of counseling visits was somewhat higher (with the confidence intervals marginally overlapping) for the “Nudge x 2” group indicating that students who received the nudging email in the second round went to counseling more. Figure ?? plots the average number of counseling visits by race. In the first round, the average number of counseling visits was very similar for White students in both groups. However, the average number of visits were somewhat higher for non-White, Black and Asian students in the “Nudge” group compared to the “Info” group. In the second round, the average number of counseling visits was higher for the “Nudge x 2” for White students but there was no such distinct difference for non-White, Black and Asian students. Overall, the nudge seems to have increased the average number of counseling visits only for minority students in the first round and only for White students in the second round.

## 5 Experimental Results

### 5.1 The Effect of Block Variables on Utilization of Counseling

The effectiveness of block randomization relies on whether the block variables were actual predictors of the outcome. Data on the number of visits were made available after the experiment took place, so I could only test the effects of the block variables on the number of visits post-treatment. Table ?? shows the effects of block variables on counseling visits after the first and the second round of emails. All block variables had a statistically significant effect on the outcome. Notably, female students were about 3 percentage points more likely to go to counseling, after both the first and second round of emails. This finding represents roughly a 60% increase in the likelihood of going to counseling, relative to the baseline mean, which is consistent with the existing literature.<sup>30</sup> However, female students who utilized counseling at least once, visited the services almost 0.3 times less, after the first round of

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<sup>30</sup>See for example ? and ?.

emails. This represents almost a 20% decrease, relative to the mean levels.

The same effect was positive, yet insignificant, after the second round of emails. This finding could be explained by a male suicide that happened a month before the first round of emails. In this context, males could be less inclined to go to counseling, but when they do they could be in greater need of the services than females. For instance, male friends of the victim or other male students on campus, who were triggered by this tragic event, may have had a greater need to repeatedly utilize counseling compared to females. Male visits may have also been prioritized by SHS. This effect could be significant in the first round, as it was the closest one to the suicide.

Racial background also played a significant role in the utilization of counseling services. After the first round, Black students were 1.4 percentage points less likely to utilize counseling, which was a 28% decrease relative to the baseline average. After the second round, Black students were about 1.9 percentage points less likely to utilize counseling, which was a 37% decrease relative to the baseline mean. After the second round of emails, Black students, who made use of the service at least once, reduced the number of visits by 0.2, which was a 14% decrease relative to the baseline average, compared to their White peers. The same effect was not statistically significant after the first round of emails.

Similarly, Asian students were about 2 percentage points less likely to utilize counseling after the first round of emails, and 1.4 percentage points less likely to utilize counseling after the second round of emails. These effects represented a 40% and a 28% lower rate of treatment relative to the mean levels, respectively. The effects on the number of services were statistically insignificant for Asian students, possibly due to the small number of Asian students who utilized counseling at least once. The results for Black and Asian students are aligned with the literature that has found lower rates of treatment for these racial minorities in the US.<sup>31</sup> The decrease in the number of visits for Black students who visited the services at least once could be greater after the second round because more Black students compared to

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<sup>31</sup>See ?, ? and ?.



White students work while in college; as the semester came to an end, the Black students may have had less time to schedule an appointment. Utilization was not statistically different for Hispanic, other, and mixed-race students. Hispanic students' visits had a wider distribution, possibly due to the diversity of Hispanic students in college. Other and mixed-race students were fewer on campus, and that may be driving their insignificant results.

Class was another significant determinant of the rate of treatment. After the first round of emails, the rate of treatment for freshmen was not more significantly different than the rate of treatment for seniors. After the second round of emails, freshmen were about 0.7 percentage points more likely to utilize the counseling services, which was a 14% higher rate of treatment relative to the baseline average, compared to seniors. However, freshmen who utilized the services at least once decreased the number of counseling visits by about 0.22 percentage points, after the second round of emails. The second round of emails launched when students were typically busier with midterms and class assignments. The stress levels freshmen experienced at that time could have affected their probability of seeking counseling. Seniors who already utilized counseling may have been in greater need of repeated treatment compared to freshmen. For freshmen, high stress levels in college are unprecedented, so any help could make a difference. Seniors who utilized counseling, on the other hand, may have greater underlying issues. Compared to seniors, sophomores did not have a significantly different probability of going to counseling in either round. After both rounds, sophomores who made use of counseling at least once visited counseling about 0.15 to 0.17 times less (a 10% to 11% decrease relative to the baseline mean) compared to seniors. This difference could be attributed to seniors having greater experience with the on-campus services: seniors may have been more familiar, and therefore may have realized the need for continuous treatment. Seniors who used the services may have also been in greater need due to the added stress of graduation, or perhaps they decided to take advantage of the opportunity of accessible mental health care that may not be covered by their insurance post-graduation. Juniors did not have a significantly different rate of treatment compared to seniors. Overall, juniors had

more similar behavior to seniors than freshmen and sophomores, which was expected since they were on average closer in age and college progression.

As suspected, honors students had a different rate of treatment compared to the rest of the student body. Honors students were approximately 2 percentage points more likely to go to counseling after both rounds of email, which was a 40% increase relative to the baseline mean. After the second round of emails, honors students who utilized counseling at least once visited the service 0.16 more times compared to non-honors students. That represented an 11% increase relative to the mean. This result could be explained by the higher stress levels high-achieving students incur as the semester progresses.

## 5.2 The Effect of Nudging on Utilization of Counseling

Table ?? displays the results from estimating equation ?? for the first and the second round of counseling visits. Panel A includes the results for the first round of treatment and panel B includes the results for the second round of treatment. The first two columns include the estimates and average marginal effects of the Logit model without college fixed effects. The third and fourth columns include the estimates and average marginal effects of the Poisson model without college fixed effects. The fifth and sixth columns include the estimates and average marginal effects of the Logit model with college fixed effects, and the last two columns include the estimates and average marginal effects of the Poisson with college fixed effects. The last row of each panel includes the randomization inference p-values for the coefficients of interest.

In the first round, the nudge did not have any significant effect on the probability of going to counseling or the number of counseling visits for those who made use of the service at least once. Receiving the nudging email in the first round had a minor negative and insignificant effect of the range of 1.7% to 1.5% relative to the mean levels on the probability of utilizing counseling. Since the number of observations was relatively high, there was enough statistical power to detect a significant effect. However, I could not reject the null hypothesis of a null

effect which makes the negative effect almost negligible. Moreover, the nudge sent in the first round of emails had a positive but insignificant effect on the number of visits, for the students who were utilizing counseling, of the magnitude of about 3.5 percentage points or 0.04 visits. Randomization inference verified these results. Figure ?? with Panels (a) and (b) shows how common these results were after the re-randomization of treatment. Overall, the nudge was not significantly affecting the rate of treatment in the first round, when looking at the entire undergraduate student body.

In the second round, the nudge variable captured whether students belonged in the “Nudge” or “Nudge x 2” group, and the reminder variable captured whether students belonged in the “Info x 2” or “Nudge x 2” groups (i.e., whether they received a second email in the second round). None of the variables had a significant impact on the probability of utilizing counseling. Students who were nudged in the first round but not in the second had about a 0.3 percentage points higher but insignificant likelihood of making use of counseling. Similarly, students who received the basic information email for a second time in the second round also had a 0.3 percentage points higher but insignificant likelihood of utilizing counseling. Most importantly, students who were nudged in the first round and then again in the second round were about 1 percentage point more likely to make use of counseling without the effect being statistically significant.

For students who utilized counseling, receiving the nudging email in the first round, but not in the second, significantly decreased the number of counseling visits by approximately 27 percentage points or 0.18 fewer visits. At the same time, for those who utilized counseling, being nudged in the second round significantly increased the number of visits by about 35 percentage points or 0.24 visits. Thus, students who used counseling used it less when they were not nudged in the second round, while students who used counseling used it more when they were nudged in the second round. It seems that when looking at the entire student body the nudge was effective only in the second round, and it acted as a reminder to schedule another visit only for the students who were frequent visitors. Randomization inference

verified this result. Figure ?? with Panels (a) and (b) shows how common the effect of the second round nudge was on the probability of going to counseling and how unique the effect of the second round nudge was on the number of visits, for individuals that made use of the service at least once.

### 5.3 The Effect of Nudging on Utilization of Counseling by Race

Block randomization ensured that racial subgroups were available for analysis. Table ?? displays the effect of the nudge in the first and second round for White, non-White, Black, and Asian students. The first two columns show the estimates and the average marginal effect of the nudge on the probability of going to counseling for White students. The third and fourth columns show the estimates and the average marginal effect of the nudge on the number of counseling visits for White students who went to counseling at least once. The fifth and sixth columns show the estimates and the average marginal effect of the nudge on the probability of going to counseling for non-White students. The seventh and eighth columns show the estimates and the average marginal effect of the nudge on the probability of going to counseling for Black students, and the last two columns show the estimates and the average marginal effect of the nudge on the probability of going to counseling for Asian students. The Poisson model could not be estimated for non-White, Black, and Asian students because very few of them utilized counseling at least once.

In the first round, the nudge slightly decreased the probability of making use of counseling for White students. However, this effect was very small in size, it represented a 5.8% decrease from the mean level, and it was statistically insignificant even with the large sample of White students. When looking at the White students who utilized counseling at least once, the nudge increased slightly their use of counseling services in the first round by 1.66 percentage points or 0.02 visits. This effect was also statistically insignificant.

The nudge and the repetition of treatment in the second round did not have a significant effect on White students' probability of going to counseling. White students who did not

receive the second round nudging email were about 0.06 percentage points more likely to utilize counseling, but the effect was insignificant. Likewise, White students who received the basic information email in the second round were 0.4 percentage points more likely to make use of counseling, but the effect was insignificant. White students who were nudged in the second round were about 0.2 percentage points more likely to use counseling afterwards, but the effect was once again statistically insignificant. Therefore, the nudge was not significantly successful in changing the probability of going to counseling for White students after both rounds of treatment.

The same was not true for White students who utilized counseling at least once in the second round. For them receiving the nudging email in the second round significantly increased the number of counseling visits by 34 percentage points or by 0.25 visits. Receiving the nudging email in the first but not in the second round and receiving the basic information email in the second round had both a small positive but insignificant effect on the utilization rate. Accordingly, the nudge affected White students who utilized counseling in the second round of treatment. Moreover, the results for all students, discussed in part ??, were mainly driven by the effects of White students.

On the contrary, non-White, Black, and Asian students were more likely to make use of counseling as a result of the nudge in the first round. After the first round, non-white students, who received the nudging email, were approximately 0.9 percentage points more likely to utilize counseling. This effect represents a 21% increase compared to the average level. Black students were 1.5 percentage points more likely (a 51% increase compared to the average) and Asian students were 1.6 percentage points more likely (a 54% increase compared to the average) to utilize counseling after receiving the first round nudging email. Although all were sizable effects, only the effect for Black students was statistically significant at conventional levels. The effects of the nudge for non-White and Asian students were marginally insignificant which was also verified from the randomization inference p-values. In figure ??, Panels (c), (d) and (e) show how unique these effects were. Although White

students were not successfully nudged in the first round, minority students were.

Receiving a second email and/or being nudged did not have a significant effect on the likelihood of going to counseling for racial minorities. For non-White, Black, and Asian students who were nudged in the first round, not receiving the second round nudging email insignificantly increased the probability of going to counseling. For the same populations, receiving the basic email in the second round had a negative but insignificant effect on the likelihood of going to counseling. Non-White students receiving the nudging email in the second round were insignificantly less likely to utilize counseling. Black and Asian students receiving the nudging email in the second round were insignificantly more likely to utilize counseling.

The differential effect of nudging on the utilization of counseling could be driven by the needs and barriers of the different on-campus populations. White students who utilized counseling experienced an increase in the utilization of services after they were reminded of them in the second round. If White students were already more aware of and familiar with the services that were offered then, the nudge was only successful as a reminder for the ones that were already going to schedule another appointment. They may have also had higher accessibility to outside off-campus options, and stigma may have not been as much of a barrier to them. All these could be reasons why nudging was not as successful in increasing the probability of going to on-campus counseling for White students.

Non-White, Black, and Asian students experienced an increase in the likelihood of going to counseling as a result of the nudging email they received in the first round. These racial minorities may have not had the same access, information, and perception regarding stigma as White students. Consequently, the nudge was successful from the very first round in increasing their chances of going to counseling. The fact that racial minorities were more easily nudged also reveals their greater need for access to treatment. However, in the second round, nudging was unsuccessful for non-White, Black, and Asian students. This could be driven by various reasons. After utilizing counseling because of the first round nudge,

they could decide based on their experience whether they needed to visit the service again. The first triage appointment may have not been what students expected, which may have influenced their perception and future use. After the first impression, the nudge could have been unsuccessful in influencing behavior. Moreover, students who were influenced by this small intervention could have been the ones that were on the margin of visiting the services. Students who were in greater need may have been in greater denial too, so nudging could possibly be less effective for those who would be more likely to repeat treatment.

## 5.4 The Effect of Nudging on Students' Involvement

To investigate whether there were any synergies between receiving mental health care and students' involvement, I tested the effect of nudging on involvement. Table ?? presents the effects of the nudge and the reminder on the probability of going to social events, the wellness and fitness center, and being a part of a student organization for all students. Table ?? presents the effects of the nudge and the reminder on the probability of going to social events by race. Table ?? presents the effects of the nudge and the reminder on the probability of going to the wellness and fitness center by race. Table ?? presents the effects of the nudge and the reminder on the probability of being a member of a student organization by race.

When looking at the entire student body, the nudge and the reminder did not have a significant effect on involvement. After the first round, nudging decreased the likelihood of attending a social event by 0.22 percentage points or by about 2% relative to the mean. At the same time, receiving the first round nudging email increased the probability of visiting the wellness and fitness center by approximately 0.6 percentage points, or by about 1.6% relative to the mean. Receiving the nudging email in the first round also increased the likelihood of becoming a member of a student organization by 0.3 percentage points, or less than 1% relative to the mean. All three effects were minuscule and statistically insignificant.

Consistent with the first round results, the second round reminder and nudge did not significantly affect involvement for all students. More specifically, being nudged in the first

but not in the second round insignificantly decreased the probability of attending a social event but insignificantly increased the probability of going to the wellness and fitness center and the likelihood of becoming a member of a student organization. All effects were below 1.5% relative to the baseline mean levels and statistically insignificant. Receiving the reminder in the first but not in the second round decreased the probability of attending a social event and being a member of a student organization but increased the likelihood of visiting the wellness and fitness center. All three of these effects were below 3% relative to the baseline mean levels and statistically insignificant. More importantly, the effect of receiving the nudging email again in the second round decreased the probability of going to a social event by around 3 percentage points—about a 33% decrease relative to the mean, a sizable but insignificant result. The effect of receiving the nudging email repeatedly in the second round also insignificantly decreased the probability of visiting the wellness and fitness center by around 4 percentage points, which was a 12% decrease relative to the mean. The effect of receiving the nudging email for a second time insignificantly increased the probability of becoming a member of a student organization by around 0.3 percentage points, which was less than a 1% increase relative to the mean. Overall, receiving the nudging email in the second round did not have a significant effect at any conventional levels, which was also verified by the randomization inference p-values that correspond to the interaction terms.

Interestingly, nudging has differential effects when looking at each involvement variable by race. For White students, nudging in the first round decreased the probability of attending a social event by 0.5 percentage points (a 6% decrease relative to the mean), increased the probability of going to the wellness and fitness center by 0.8 percentage points (a 2% increase relative to the mean), and decreased the probability of becoming a student organization member by 0.1 percentage points (a 0.2% decrease relative to the mean). All effects were insignificant at conventional levels, although the first two effects were marginally so. After the first nudge, White students were slightly more engaged in fitness and wellness than social events. The effect on the likelihood of becoming a student organization member could be



small and insignificant due to most organizations' early recruitment that took place even before the first round of emails. Along with the insignificance of the effect of the first round of nudging on the utilization of counseling for White students, the effect of the first round of nudging on White students' involvement was also insignificant.

Receiving a second email and/or being nudged in the second round did not have a significant effect on involvement for White students. Receiving the first nudge but not the second decreased participation in social events and student organizations and increased visits to the wellness and fitness center. However, all effects were lower than 6% relative to the mean levels and insignificant. Receiving the first informative email but not the second decreased participation in social events and student organizations and increased visits to the wellness and fitness center. All effects were lower than 3% relative to the mean levels and insignificant. Being nudged and reminded in the second round increased the likelihood to participate in social events and student organizations, while it increased the probability of visiting the wellness and fitness center. All three of these effects were lower than 4% relative to the mean and insignificant. As a result, White students' involvement was not significantly affected by the nudge in the second round. The significance levels calculated using randomization inference verified both the first and the second round of effects.

For non-White students, nudging in the first round increased the probability of attending a social event by 0.9 percentage points (a 10% increase relative to the mean) and the probability of becoming a student organization member by 2 percentage points (a 4% increase relative to the mean), while it decreased the probability of visiting the wellness and fitness center by 0.7 percentage points (a 2% increase from the mean). All effects were insignificant at conventional levels, although the effect on the probability of becoming a student organization member was marginally so. Even though most organizations had early recruitment, organizations that continued their recruitment until later in the semester had more diverse members, which could be driving this marginal result.

Like for White students, receiving a second email and/or being nudged in the second

round did not have a significant effect on involvement for non-White students. Receiving the first nudge but not the second increased all measures of involvement. The effects on the likelihood of visiting the wellness and fitness center and becoming a student organization member were lower than 2% relative to the mean levels, whereas the probability of attending a social event was 15% relative to the mean levels. All effects were statistically insignificant at all significance levels. Receiving the first informative email but not the second insignificantly increased participation of non-White students in all levels of involvement. The magnitudes of these effects were less than 4% relative to the mean levels and insignificant. More importantly, being nudged and reminded in the second round increased the likelihood of visiting the wellness and fitness center, while it decreased the likelihood of participating in a social event and a student organization. The largest of these interaction effects was 10% relative to the mean level, while all of them were statistically insignificant. The insignificance of these effects was verified using randomization inference.

For Black students, nudging in the first round increased all involvement variables. The probability of attending a social event increased by 2 percentage points (a 22% increase relative to the mean), the probability of becoming a student organization member increased by approximately 3 percentage points (a 20% increase relative to the mean), and the probability of visiting the wellness and fitness center increased by about 3 percentage points (a 8% increase from the mean). Only the effect of the nudge on attendance of social events was statistically significant at conventional levels. Hence, the first nudging email not only impacted Black students' utilization of services but also their participation in social events. Black students who were nudged sought professional help as well as the support of the community. The difference between Black students and other race groups could be driven by their cultural differences. Higher involvement in the first round could also be the reason why Black students were not successfully nudged to go to counseling in the second round. Relying on one's own support system is a common reason why high-risk college students avoid counseling (?).

Receiving a second email and/or being nudged in the second round had effects of various magnitudes that were insignificant for Black students. Receiving the first nudging email but not the second increased all measures of involvement. Effect sizes varied from 8% to 24% relative to mean levels. Regardless, all effects were statistically insignificant at all significance levels. Receiving the first informative email but not the second increased Black students' wellness and fitness center visits as well as Black students' participation in student organizations but decreased their likelihood of going to a social event. The magnitude of these effects was less than 8% relative to the mean levels. Moreover, being nudged and reminded in the second round decreased the likelihood of Black students' involvement regardless of the measure used. Even though the size of these effects ranged from 9% to 37%, all of the interaction effects were statistically insignificant. The insignificance of the interaction terms was also verified by the randomization inference p-values calculated.

For Asian students, nudging in the first round decreased the probability of engaging in social events and the probability visiting the wellness and fitness center but increased the probability of becoming a student organization member. The likelihood of attending a social event decreased by 0.9 percentage points (a 9% decrease relative to the mean), the probability of visiting the wellness and fitness center decreased by about 3 percentage points (a 7% decrease from the mean), and the probability of becoming a student organization member increased by approximately 3 percentage points (a 6% increase relative to the mean). However, all of these effects were statistically insignificant at all significance levels.

Receiving a second email and/or being nudged in the second round had insignificant effects of moderate magnitudes for Asian students. Receiving the first nudge but not the second decreased all measures of involvement, apart from the probability of becoming a student organization member. Effect sizes varied from 3% to 18% relative to mean levels while all were statistically insignificant. Receiving the first informative email but not the second, insignificantly decreased all variables of involvement for Asian students. The magnitude of the effects was less than 4% relative to the mean levels. More importantly, being nudged

and reminded in the second round decreased the likelihood of Asian students' involvement regardless of the measure used. Even though the size of these effects ranged from 8% to 15%, all of the interaction terms were statistically insignificant at all significant levels.

## 6 Robustness Checks

In this section, I present the results estimated on the utilization of all services provided at the SHS, including counseling, psychiatry, group counseling and coaching.<sup>32</sup> Table ?? displays the results of the block variables on the use of all services. Table ?? shows the effect of the nudge on the use of all services for all students and Table ?? includes the effect of the nudge on the use of all services by race. All three tables follow the same format as the ones presented using counseling as the outcome variable.

### 6.1 The Effect of Block Variables on Utilization of All Services

Block variables significantly affected the use of all services similar to the use of counseling only. More specifically, females were about 4 percentage points more likely (a 50% increase relative to the baseline mean) to visit the mental health services after both the first and the second round of emails. This effect was very similar to the one found using counseling visits as the outcome variable. Females who utilized the mental health services at least once visited them less compared to males in the first round and more compared to males in the second round. The signs of both of these effects were similar to the ones found using counseling visits as the outcome variable, although the effect of the first round was insignificant with all services as the outcome variable, and significant with counseling visits as the outcome variable. The second round effect was insignificant regardless of the outcome variable used.

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<sup>32</sup>I could not estimate the effect of the nudge separately on psychiatry, group counseling and coaching because there were not enough students who went to these services separately. The most popular one that could be studied by itself is counseling. Counseling was also important to be looked at separately for students who received mental health care for the first time as their first triage appointment was considered to be a counseling visit.

When examining all services I added to the number of counseling visits three more types of services: psychiatry, coaching, and group therapy. Repeated visits in coaching and group therapy were not formally scheduled between a student and a therapist like counseling and psychiatry sessions which could influence students' commitment as well as their reaction to the nudge.

The use of all mental health services for different racial and ethnic minorities was also analyzed. After the first round of emails, nudged Black students were 1.9 percentage points less likely (a 37% decrease relative to the baseline mean) to request mental health care compared to their White counterparts. After the second round, nudged Black students were 2.4 percentage points less likely (a 40% decrease relative to the baseline means) to use the services, compared to White students. The results on the number of visits for Black students who utilized the services at least once were not statistically significant. Similar to previous findings regarding counseling, Asians were approximately 2.4 percentage points less likely (a 48% decrease relative to the mean levels) to use the services after the first round of emails and 1.7 percentage points less likely (a 28% decrease relative to the mean levels) to use the services after the second round of emails. The effects on the number of services utilized by Asians that used them at least once were statistically insignificant. Similar to the results of the previous section the effects for Hispanic, other and mixed-race students were not statistically significant.

Class remained a significant determinant of the rate of treatment when using all services as the outcome variable. After the first round of emails, freshmen were 0.63 percentage points less likely (a 12.6% decrease relative to the mean levels) to make use of the services. This effect was stronger and statistically significant compared to the one using counseling as the outcome variable. Freshmen in the beginning of the semester may not have necessarily known about all of the other services offered on campus or they may have been more hesitant in trying them compared to seniors. After the second round of emails, freshmen were less likely to visit the services but the effect was not statistically significant. Hence, freshmen near the

mid-end of the semester could have been significantly more likely to go to counseling but not to all of the other services offered. After the second round of emails, freshmen who utilized the services at least once went about 0.2 times less, compared to seniors. This statistically significant result parallels the one using counseling as the outcome variable. After the first round of visits, sophomores were almost 0.9 percentage points less likely (an 18% decrease relative to the mean levels) to visit the services, compared to seniors. This effect was not significant when using the number of counseling visits as the outcome variable, so sophomores were even less inclined to use all services compared to counseling only. After the first round of visits, sophomores that utilized the services visited them 0.21 times less (an 11% decrease relative to the mean levels) compared to seniors. This effect parallels the one found using counseling as the outcome variable. After the second round of visits, sophomores did not have a different rate of treatment compared to seniors. Hence, sophomores that utilized counseling used it more often compared to seniors, but that was not the case for sophomores that utilized at least one of all the services offered on campus. Similar to previous findings, juniors did not have a significantly different rate of treatment compared to seniors.

The effects for honors students were very similar regardless of the outcome variable used. After the first and second round of emails, honors students had a 2.4 percentage points higher likelihood of going to counseling. That was a sizable and significant increase of about 49% from the baseline average. After the second round of visits, honors students who utilized the services, visited them 0.3 times more (an 20% increase relative to mean levels) compared to non-honors students.

## **6.2 The Effect of Nudging on Utilization of All Services**

The effects of nudging on the utilization of all services were very similar to those on the utilization of counseling only. In the first round, receiving the nudging email had a minuscule negative and insignificant effect on the probability of using the services of the size of 0.01 percentage points in the first specification, and of the size of 0.001 percentage points in the

second specification. This result was aligned with the corresponding effect on the probability of going to counseling. Receiving the nudging email in the first round also caused a negative, small insignificant decrease of (at most) 0.9 percentage points or 0.01 visits on the number of services utilized by individuals who made use of a service at least once. The corresponding effect was positive and insignificant when using the number of counseling visits as the outcome variable. Hence, the nudge impacted somewhat positively the utilization of counseling for individuals that made use of counseling and somewhat negatively the utilization of all services for individuals that made use of any service with none of these effects being statistically significant. Randomization inference analysis verified these results.

In the second round, none of the variables that indicated being nudged and/or receiving a second email significantly affected the probability of making use of a service. This complements the main results that estimated the same effects on the probability of utilizing counseling. However, all variables indicating being nudged and/or receiving a second email had a significant effect on the number of visits for the students who utilized the services at least once. Students who did not receive a reminding nudging email and made use of the services in the second round visited the services 25 percentage points or about 0.28 times less. Those who made use of the services at least once and received a second email but with only the basic information visited the services about 21 percentage points or 0.24 times less. More importantly, the students who made use of the services at least once and received a second nudging email used the services approximately 36 percentage points or 0.41 times more. The effect of receiving the second email with basic information was statistically significant only when having all services and not when having counseling as the dependent variable. Randomization inference also verified the significance of the interaction term on the number of visits for students who made use of them.

### 6.3 The Effect of Nudging on Utilization of All Services by Race

The analysis of the effect of nudging on the utilization of all services by race entailed similar results to those on the utilization of counseling only. In the first round, the nudge slightly decreased the probability of going to any service for White students. However, this effect was very small in magnitude (0.05 percentage points) and it was statistically insignificant. This finding was similar to the one found using counseling visits as the outcome of interest both in terms of sign and in terms of significance. When looking at White students who utilized the services at least once the nudge insignificantly decreased the number of services they used in the first round by 6 percentage points or by 0.08 visits. This effect was opposite in sign but still insignificant, compared to the effect found using counseling as the dependent variable.

In the second round, none of the variables that indicated being nudged and/or receiving the second email significantly affected the probability of White students utilizing a service. As for the White students who made use of the services at least once receiving the nudging email in the first but not in the second round significantly lowered their number of visits by about 26 percentage points. For White students who made use of services at least once receiving the basic email in the first but not in the second round significantly decreased their number of visits by 19 percentage points. With counseling visits as the dependent variable both of these effects were negative but still statistically insignificant. After receiving the nudging email in the second round, White students who utilized a service at least once visited counseling 43 percentage points more, similar to previous results. The second round results for White students who utilized the services were strengthened in significance when using all services as the outcome of interest and not counseling only.

In the first round, nudging impacted non-White, Black, and Asian students' visits to all services similarly to counseling visits. Non-white students who received the nudging email in the first round were 0.79 percentage points more likely (a 20% increase from the average) to utilize a service. Black students who received the nudging email in the first round were



2 percentage points more likely (a 52% increase from the average) to utilize a service and Asian students who received the nudging email in the first round were also 2 percentage points more likely (a 52% increase from the average) to utilize a service. When using all services combined both the effect for Black and the effect for Asian students were statistically significant. This result was also verified from the randomization inference p-values.

The second round results for racial minorities on the utilization of all services were also very close to the ones found using only counseling visits as the dependent variable. For non-White, Black, and Asian students who were nudged in the first round not receiving the second round nudging email, had a positive but insignificant effect in the probability of seeking help. For the same populations, receiving the basic email in the first but not the second round insignificantly decreased the probability of seeking help and the effect of receiving the nudging email in the second round insignificantly increased the probability of seeking help. All effects were very small in magnitude and statistically insignificant.<sup>33</sup>

## 7 Conclusion

Summarizing, this is the first study that used a descriptive social norm statement to improve the utilization of counseling services for college students. Findings suggest that racial minorities were affected the most by the initial implementation of the nudge in terms of services utilized and social engagement on campus. In this section, I discuss the cost effectiveness of this treatment, implications of these findings, and possible future work.

The results in this study suggest that nudging could have some positive impact on the utilization of services, and hence, it should be considered among other traditional outreach activities. In 2021, SAMHSA announced the distribution of \$3 billion in the American Rescue Plan funding for its mental health and substance use block grant programs. This was the

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<sup>33</sup>The coefficients for non-White students in the Logit model were positive but on average for all non-White students the marginal effect of the interaction term was negative. That was expected given the small and insignificant magnitude of the effect.

largest aggregate amount of funding to date.<sup>34</sup> Grants were provided to various agencies to prevent and treat addictive and mental disorders and to suggest public campaigns, system reform, policy and program analysis.<sup>35</sup> In 2021, efforts are being focused on minorities that were heavily impacted by COVID-19. UofSC received over \$300,000 in grant funds from 2018 to 2021 from SAMHSA to deepen the mental health infrastructure, increase access to mental health, and change the mental health culture on campus by decreasing barriers to care and by, focusing on at-risk individuals and individuals who do not utilize the services.<sup>36</sup> Although nudging had a limited effect on White students, it greatly impacted minorities that are in high need and a primary focus area for policy makers.

In examining the most efficient allocation of these resources, college officials need to take into account the relative effectiveness of nudges compared to traditional policy tools. ? suggested that the impact of nudges is often greater on a cost-adjusted basis than that of traditional tools. To evaluate this claim, officials should compare the effect of other traditional outreach activities with that of a nudge, correcting for the implementation costs. This study suggests that the analysis should also be conducted by race to make sure decisions are inclusive to all populations.

Racial minorities were possibly affected the most by the nudge due to their greater need for access to mental health services. For those students seeking mental health care, the majority seek care on campus.<sup>37</sup> However, not all colleges are in the business of providing mental health care. Even the universities that currently do are examining the possibility of outsourcing these services to outside parties.<sup>38</sup> Outsourcing could potentially reduce accessibility further for the most vulnerable populations on campus. The results of this study suggest that regardless of the direction schools need to take, there is a high need for making services more accessible, especially, for the vulnerable racial minorities on campus.

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<sup>34</sup>The announcement of the Department of Health and Human Resources.

<sup>35</sup>SAMHSA's budget can be found here.

<sup>36</sup>The SAMHSA website lists all grants by state.

<sup>37</sup>American College Health Association–National College Health Assessment, Undergraduate Student Reference Group , Executive Summary, Fall 2019, p.5

<sup>38</sup>According to anecdotal evidence and articles like this one from the Guardian.

This paper lacks information on students' health insurance plans. In future work, it will be interesting to investigate the use of services by the type of health insurance plan. The Student Health Insurance Plan at UofSC is the only one in-network. With this plan, students have free access to coaching, group therapy, and the first 10 counseling sessions, and need only pay a small fee for psychiatry visits. However, some services may incur out-of-network costs for students who waive the Student Health Insurance Plan. If minority students in this study relied more on the Student Health Insurance Plan, then that might be another reason why the nudge was more effective for them. During the COVID-19 pandemic, access has been even more questionable, as out-of-state students who moved back with their parents struggled to get telehealth appointments covered by their insurance.

All in all, there is a great need for mental health care that is not being matched with efforts to lower barriers and perceived stigmatization. Nudging is a promising intervention tool for bettering college student mental health, especially for minorities, and deserves further exploration by researchers in the helping professions.

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# Figures

Figure 1: Control E-mail

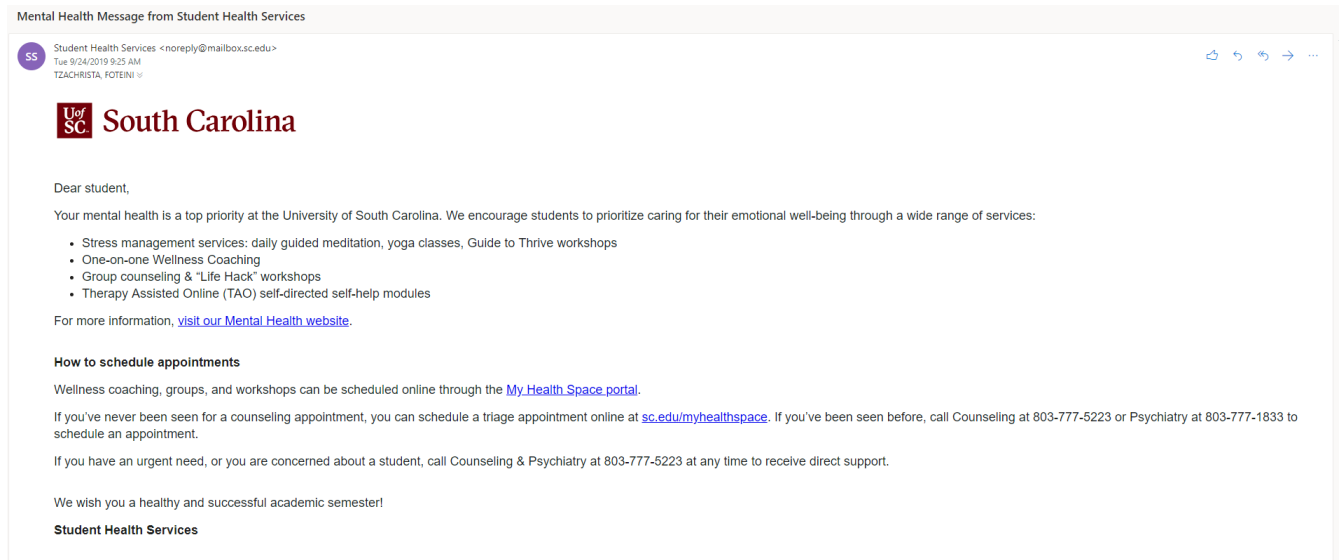


Figure 2: Treatment E-mail

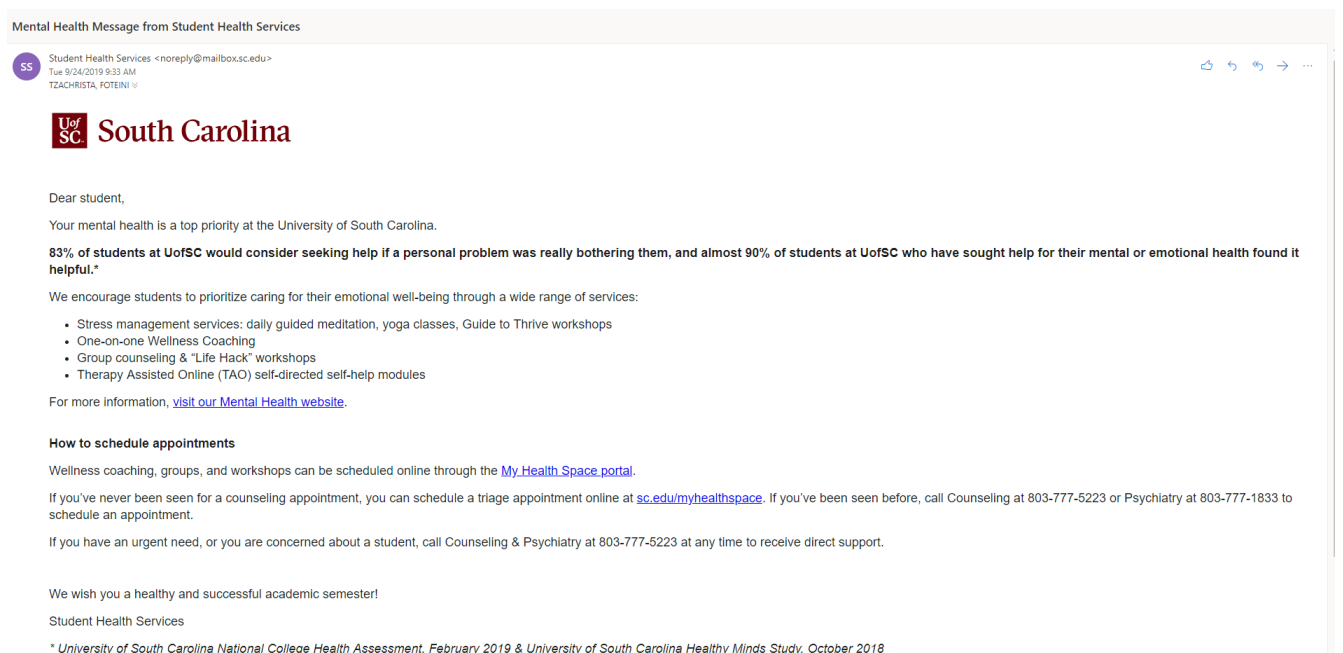


Figure 3: Average Number of Counseling Visits

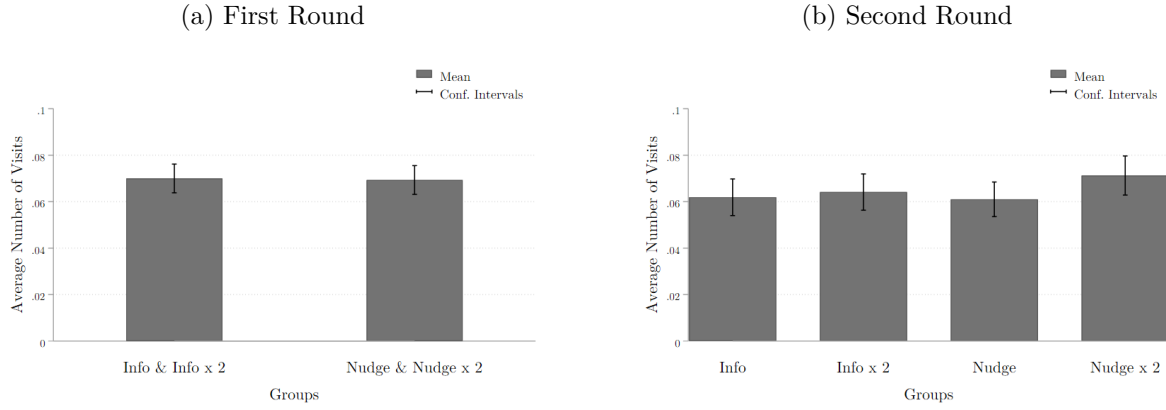


Figure 4: Average Number of Counseling Visits by Race

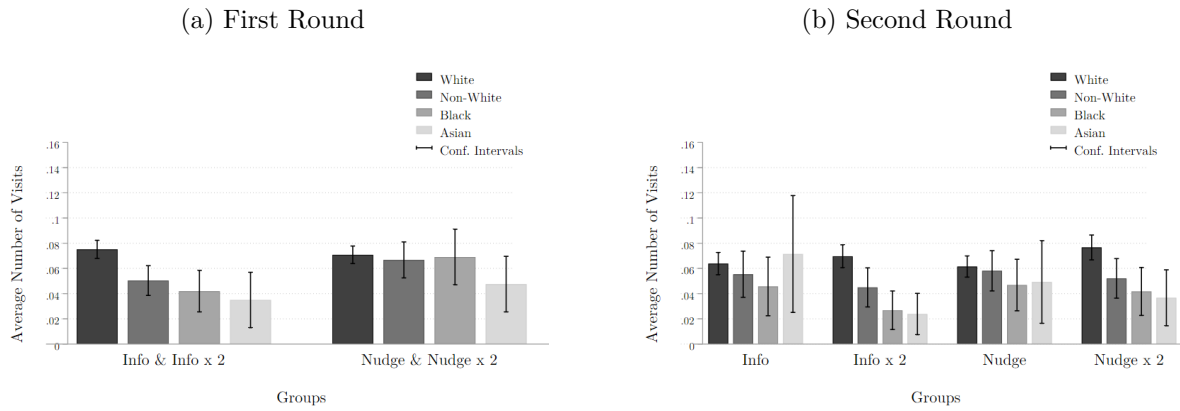
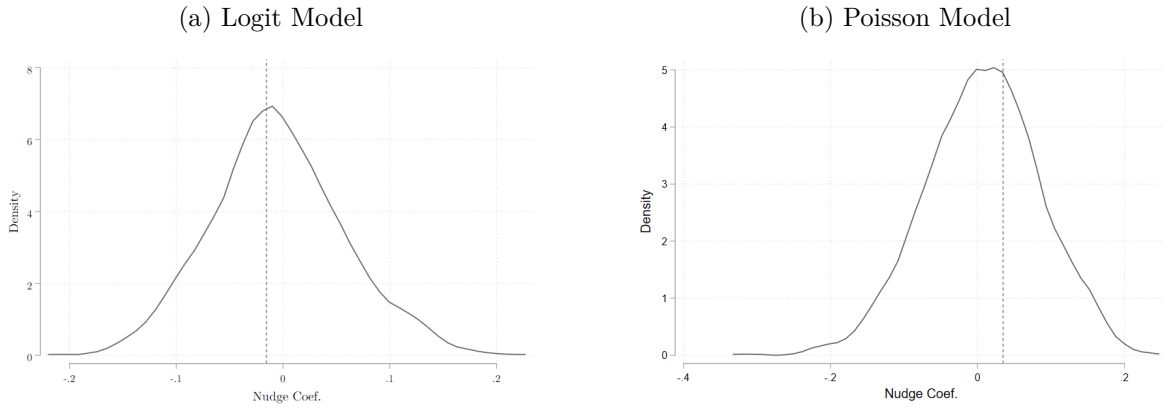
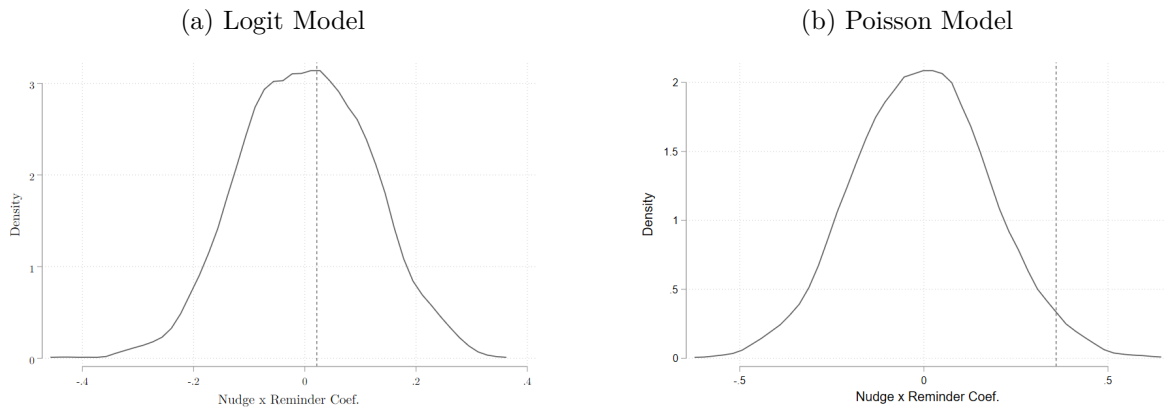


Figure 5: Nudge Estimate Densities on Counseling (First Round)



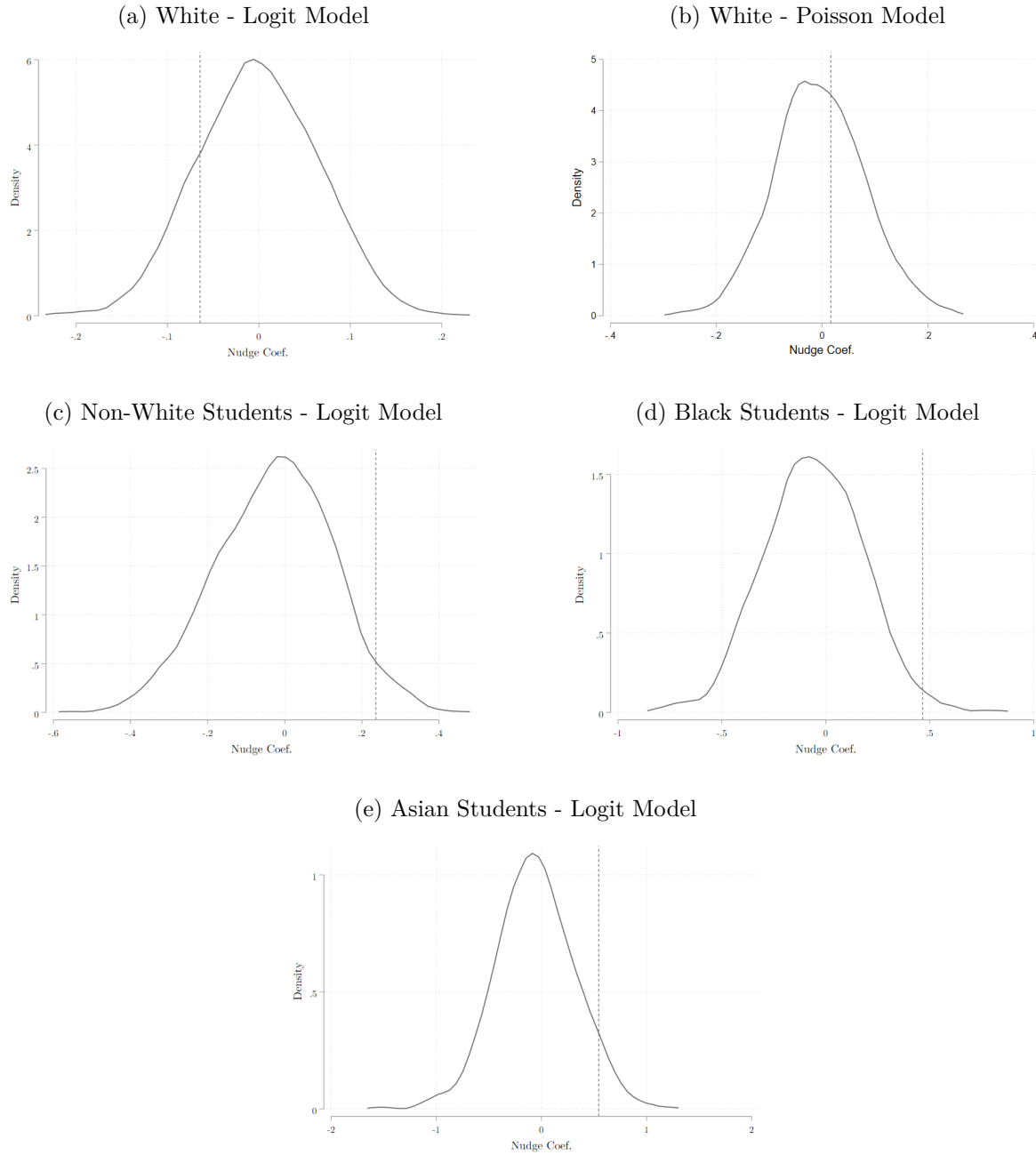
*Note*– Densities were obtained through randomization inference resampling under the null hypothesis that the estimate was insignificant. The vertical line indicates the location of the estimate under the implemented treatment assignment. The estimate in figure (a) corresponds to the one in the fifth column of Panel A in Table ???. The estimate in figure (b) corresponds to the one in the sixth column of Panel A in Table ??.

Figure 6: Nudge x Reminder Estimate Densities on Counseling (Second Round)



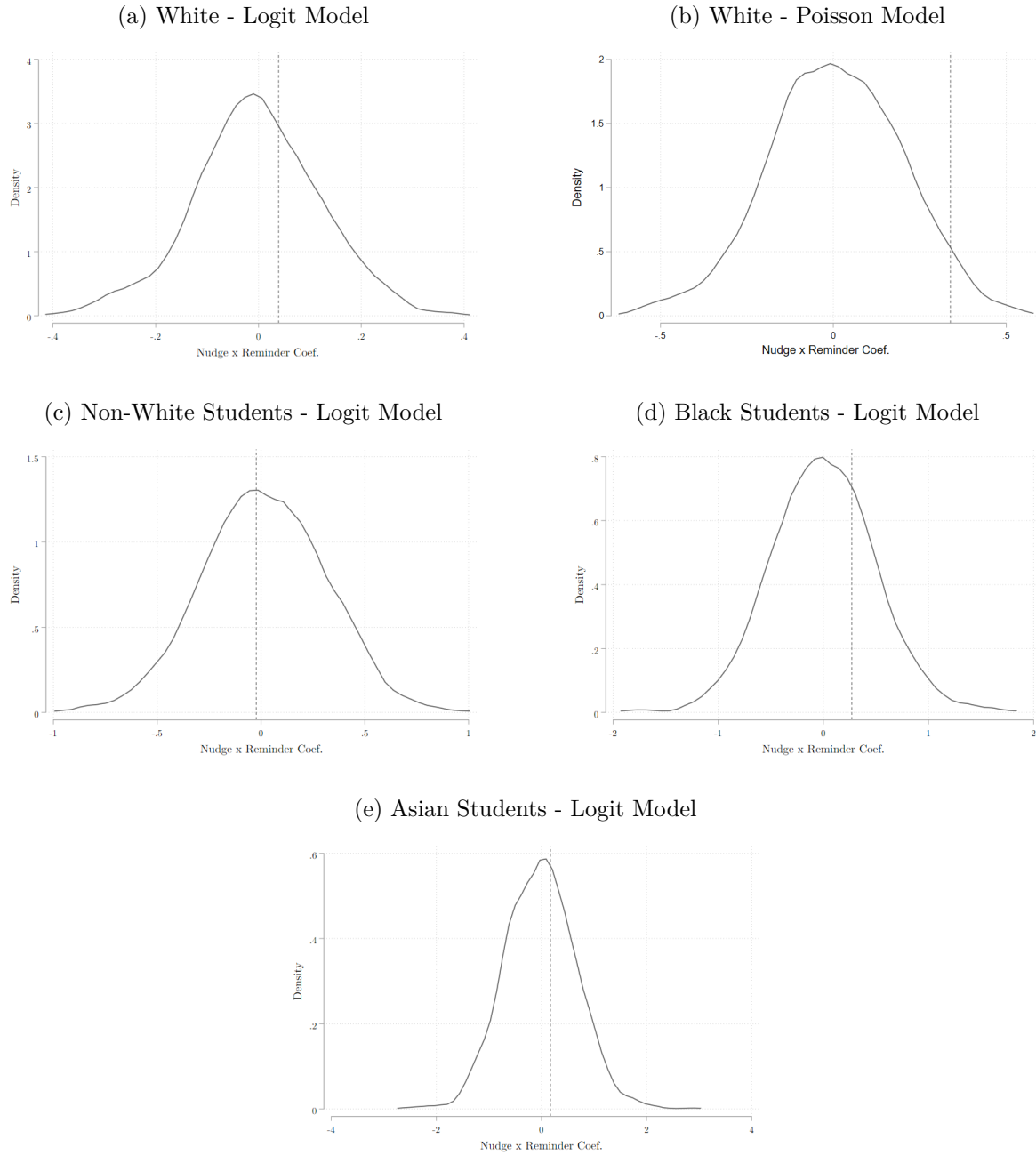
*Note*– Densities were obtained through randomization inference resampling under the null hypothesis that the estimate was insignificant. The vertical line indicates the location of the estimate under the implemented treatment assignment. The estimate in the figure (a) corresponds to the one in the fifth column of Panel B in Table ???. The estimate in figure (b) corresponds to the one in the sixth column of Panel B in Table ??.

Figure 7: Nudge Estimate Densities on Counseling by Race (First Round)



*Note*—Densities were obtained through randomization inference resampling under the null hypothesis that the estimate was insignificant. The vertical line indicates the location of the estimate under the implemented treatment assignment. The estimate in figure (a) corresponds to the one in the first column of Panel A in Table ???. The estimate in figure (b) corresponds to the one in the third column of Panel A in Table ???. The estimate in figure (c) corresponds to the one in the fifth column of Panel A in Table ???. The estimate in figure (d) corresponds to the one in the seventh column of Panel A in Table ???. The estimate in figure (e) corresponds to the one in the ninth column of Panel A in Table ??.

Figure 8: Nudge x Reminder Estimate Densities on Counseling by Race (Second Round)



*Note*—Densities were obtained through randomization inference resampling under the null hypothesis that the estimate was insignificant. The vertical line indicates the location of the estimate under the implemented treatment assignment. The estimate in figure (a) corresponds to the one in the first column of Panel A in Table ???. The estimate in figure (b) corresponds to the one in the third column of Panel B in Table ???. The estimate in figure (c) corresponds to the one in the fifth column of Panel B in Table ???. The estimate in figure (d) corresponds to the one in the seventh column of Panel B in Table ???. The estimate in figure (e) corresponds to the one in the ninth column of Panel B in Table ??.



# Tables

Table 1: Descriptives Across Treatment Groups

Variable	Info		Info x 2		Nudge		Nudge x 2	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Female	0.546	0.498	0.547	0.498	0.535	0.499	0.540	0.498
White	0.813	0.005	0.799	0.005	0.801	0.005	0.809	0.005
Black	0.082	0.003	0.090	0.004	0.090	0.004	0.087	0.003
Asian	0.048	0.003	0.051	0.003	0.049	0.003	0.049	0.003
Mixed Race	0.043	0.002	0.044	0.003	0.049	0.003	0.040	0.002
Other Race	0.005	0.001	0.005	0.001	0.003	0.001	0.004	0.001
Hispanic	0.052	0.003	0.055	0.003	0.049	0.003	0.052	0.003
Freshman	0.239	0.426	0.228	0.420	0.230	0.421	0.227	0.419
Sophomore	0.241	0.428	0.238	0.426	0.247	0.431	0.240	0.427
Junior	0.238	0.426	0.250	0.433	0.242	0.429	0.245	0.430
Senior	0.282	0.450	0.284	0.451	0.281	0.449	0.288	0.453
GPA	3.350	0.545	3.357	0.528	3.355	0.543	3.343	0.543
Honors	0.180	0.384	0.181	0.385	0.178	0.382	0.190	0.393
In-State	0.560	0.496	0.571	0.495	0.566	0.496	0.573	0.495
Counseling-1st Round	0.069	0.366	0.071	0.368	0.065	0.353	0.075	0.383
Counseling-2nd Round	0.062	0.331	0.065	0.328	0.061	0.309	0.072	0.354
Social Events-1st Round	0.088	0.283	0.088	0.284	0.085	0.279	0.084	0.278
Social Events-2nd Round	0.089	0.284	0.088	0.283	0.086	0.281	0.084	0.277
Fitness & Wellness-1st Round	0.355	0.479	0.363	0.481	0.362	0.481	0.369	0.483
Fitness & Wellness-2nd Round	0.322	0.467	0.332	0.471	0.327	0.469	0.330	0.470
Organization Member	0.480	0.500	0.479	0.500	0.480	0.500	0.484	0.500
Observations	6,643		6,642		6,643		6,642	

*Note*— Students in group “Info” received the basic information email once. Students in group “Info x 2” received the basic information email twice. Students in group “Nudge” received the nudging email once. Students in group “Nudge x 2” received the nudging email twice.

Table 2: Mean Differences Tests

	Ix2-I (1)	N-I (2)	Nx2-I (3)	N-Ix2 (4)	Nx2-Ix2 (5)	Nx2-N (6)
Female	0.001 (0.009)	-0.011 (0.009)	-0.006 (0.009)	-0.012 (0.009)	-0.007 (0.009)	0.005 (0.009)
White	-0.014 (0.007)**	-0.012 (0.007)*	-0.003 (0.007)	0.002 (0.007)	0.011 (0.007)	0.009 (0.007)
Black	0.008 (0.005)	0.008 (0.005)	0.004 (0.005)	0.000 (0.005)	-0.003 (0.005)	-0.003 (0.005)
Asian	0.002 (0.004)	0.001 (0.004)	0.001 (0.004)	-0.002 (0.004)	-0.001 (0.004)	0.000 (0.004)
Mixed Race	0.001 (0.004)	0.006 (0.004)	-0.003 (0.003)	0.005 (0.004)	-0.004 (0.003)	-0.009 (0.004)**
Other Race	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)*	-0.002 (0.001)	0.000 (0.001)
Hispanic	0.003 (0.004)	-0.003 (0.004)	0.000 (0.004)	-0.006 (0.004)	-0.003 (0.004)	0.003 (0.004)
Freshman	-0.010 (0.007)	-0.009 (0.007)	-0.012 (0.007)	0.001 (0.007)	-0.002 (0.007)	-0.003 (0.007)
Sophomore	0.012 (0.007)	0.005 (0.007)	0.008 (0.007)	-0.007 (0.007)	-0.004 (0.007)	0.003 (0.007)
Junior	-0.003 (0.007)	0.006 (0.007)	-0.001 (0.007)	0.009 (0.007)	0.002 (0.007)	-0.007 (0.007)
Senior	0.001 (0.008)	-0.002 (0.008)	0.005 (0.008)	-0.003 (0.008)	0.004 (0.008)	0.007 (0.008)
Honors	0.001 (0.007)	-0.002 (0.007)	0.010 (0.007)	-0.004 (0.007)	0.009 (0.007)	0.013* (0.007)
GPA	0.007 (0.011)	0.005 (0.011)	-0.007 (0.011)	-0.002 (0.011)	-0.014 (0.011)	-0.012 (0.011)
In-state	0.011 (0.009)	0.006 (0.009)	0.013 (0.009)	-0.005 (0.009)	0.002 (0.009)	0.007 (0.009)
P-value joint significance	0.44	0.72	0.37	0.50	0.66	0.18

*Note*— The table provides the mean comparison tests between the indicated columns. Group I represents the “Info” group that received the basic email once. Group Ix2 represents the “Info x 2” group that received the basic email twice. Group N represents the “Nudge” group that received the nudging email once. Group Nx2 represents the “Nudge x 2” group that received the nudging email twice. “P-value joint significance” refers to the p-value from the joint significance test of all coefficients obtained from a probit model using all controls to predict assignment to the Ix2 group restricting sample to Ix2 and I treatment groups (column (1)), the N group restricting sample to N and I treatment groups (column (2)), the Nx2 group restricting sample to Nx2 and I treatment groups (column (3)), the N group restricting sample to N and Ix2 treatment groups (column (4)), the Nx2 group restricting sample to Nx2 and Ix2 treatment groups (column (5)) and the Nx2 group restricting sample to Nx2 and N treatment groups (column (6)). Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 3: The Effect of Block Variables on Counseling Visits

	First Round of Visits		Second Round of Visits	
	Logit	Poisson	Logit	Poisson
Female	0.0299*** (0.0027)	-0.2768*** (0.0974)	0.0302*** (0.0027)	0.0151 (0.0784)
Black	-0.0141*** (0.0040)	0.0271 (0.1647)	-0.0185*** (0.0038)	-0.2395** (0.1106)
Asian	-0.0199*** (0.0047)	0.0200 (0.2553)	-0.0142*** (0.0052)	-0.0807 (0.2038)
Hispanic	0.0071 (0.0137)	-0.0500 (0.2710)	0.0258 (0.0160)	-0.3175 (0.2195)
Other Race	-0.0129 (0.0164)	-0.5227 (0.3354)	-0.0156 (0.0157)	-0.2803 (0.3317)
Mixed Race	0.0000 (0.0060)	0.1073 (0.1590)	0.0017 (0.0061)	0.1063 (0.1799)
Freshman	-0.0004 (0.0036)	-0.0600 (0.1020)	0.0065* (0.0039)	-0.2373*** (0.0787)
Sophomore	-0.0041 (0.0035)	-0.1504* (0.0905)	0.0003 (0.0036)	-0.1698** (0.0779)
Junior	0.0047 (0.0037)	-0.1369 (0.0921)	0.0009 (0.0037)	-0.1257 (0.0776)
Honors	0.0215*** (0.0039)	-0.0130 (0.0869)	0.0190*** (0.0038)	0.1634** (0.0744)
Observations	26,570	1,206	26,570	1,229
Mean dep. variable	0.05	1.55	0.05	1.40
College FE	Yes	Yes	Yes	Yes

*Note*—Results come from estimating equation (??) and the effects of block variables on counseling visits. The first two columns include the average marginal effect of the Logit and the Poisson model for the first round of visits and the last two columns include the average marginal effect of the Logit and the Poisson model for the second round of visits. All estimations include college fixed effects. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 4: Effect of Nudge &amp; Reminder on Counseling Visits

	Logit		Poisson		Logit		Poisson	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>								
Nudge	-0.0176 (0.0592)	-0.0008 (0.0026)	0.0376 (0.0782)	0.0356 (0.0741)	-0.0155 (0.0593)	-0.0007 (0.0026)	0.0347 (0.0782)	0.0329 (0.0739)
Observations	26,570	26,570	1,206	1,206	26,570	26,570	1,206	1,206
Mean dep. variable	0.05	0.05	1.55	1.55	0.05	0.05	1.55	1.55
RI test p-value	0.77		0.64		0.80		0.63	
<i>Panel B: Second Round Results</i>								
Nudge	0.0729 (0.0844)	0.0031 (0.0036)	-0.2678** (0.1358)	-0.1844** (0.0934)	0.0704 (0.0845)	0.0030 (0.0036)	-0.2652** (0.1352)	-0.1811* (0.0920)
Reminder	0.0698 (0.0843)	0.0030 (0.0036)	-0.0876 (0.1257)	-0.0658 (0.0947)	0.0666 (0.0844)	0.0028 (0.0036)	-0.0810 (0.1243)	-0.0605 (0.0930)
Nudge × Reminder	0.0135 (0.1174)	0.0008 (0.0052)	0.3481* (0.1816)	0.2445* (0.1298)	0.0215 (0.1175)	0.012 (0.0052)	0.3592** (0.1810)	0.0252** (0.1290)
Observations	26,570	26,570	1,229	1,229	26,570	26,570	1,229	1,229
Mean dep. variable	0.05	0.05	1.40	1.40	0.05	0.05	1.40	1.40
RI test p-value	0.92		0.05		0.87		0.05	
College FE	No	No	No	No	Yes	Yes	Yes	Yes

Note—Results come from estimating equation (??) with counseling visits as the dependent variable. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Info2, Nudge and Nudex2). All estimations control for honors status. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimate using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge × Reminder” estimate using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 5: Effect of Nudge &amp; Reminder on Counseling Visits by Race

	White				Non-White		Black		Asian	
	Logit		Poisson		Logit		Logit		Logit	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>										
Nudge	-0.0644 (0.0645)	-0.0029 (0.0029)	0.0166 (0.0863)	0.0155 (0.0804)	0.2363 (0.1511)	0.0085 (0.0054)	0.4651** (0.2339)	0.0154** (0.0077)	0.5454 (0.3593)	0.0162 (0.0105)
Observations	21,397	21,397	1,015	1,015	5,173	5,173	2,317	2,317	1,139	1,139
Mean dep. variable	0.05	0.05	1.54	1.54	0.04	0.04	0.03	0.03	0.03	0.03
RI test p-value	0.33		0.87		0.12		0.05		0.15	
<i>Panel B: Second Round Results</i>										
Nudge	0.0148 (0.0931)	0.0006 (0.0040)	-0.1742 (0.1451)	-0.1184 (0.0985)	0.3241 (0.2039)	0.0125 (0.0079)	0.2458 (0.3278)	0.0083 (0.0110)	0.0947 (0.4330)	0.0034 (0.0155)
Reminder	0.0920 (0.0915)	0.0041 (0.0041)	-0.0400 (0.1321)	-0.0290 (0.0962)	-0.0842 (0.2203)	-0.0027 (0.0070)	-0.3917 (0.3758)	-0.0099 (0.0095)	-0.3744 (0.4732)	-0.0108 (0.0136)
Nudge × Reminder	0.0390 (0.1284)	0.0019 (0.0058)	0.3388* (0.1897)	0.2458* (0.1365)	-0.0228 (0.2950)	-0.0019 (0.0109)	0.2703 (0.4934)	0.0553 (0.0148)	0.1705 (0.6395)	0.0039 (0.0201)
Observations	21,397	21,397	1,028	1,028	5,173	5,173	2,317	2,317	1,305	1,305
Mean dep. variable	0.05	0.05	1.37	1.37	0.04	0.04	0.03	0.03	0.03	0.03
RI test p-value	0.72		0.07		0.93		0.58		0.79	
College FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note—Results come from estimating equation (??) with counseling visits as the dependent variable. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). For White students the sample size allows the estimation of the Logit and Poisson model. For Non-White, Black and Asian sample size allows the estimation of the Logit model only. Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Control, Control x 2, Nudge and Nudge x 2). All estimations control for honors status. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimate with randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge × Reminder” estimate with randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 6: Effect of Nudge &amp; Reminder on Involvement

	Social Events		Wellness & Fitness		Organizations	
	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>						
Nudge	-0.0291 (0.0443)	-0.0022 (0.0034)	0.0246 (0.0261)	0.0055 (0.0058)	0.0137 (0.0252)	0.0033 (0.0060)
Observations	26,570	26,570	26,570	26,570	26,570	26,570
Mean dep. variable	0.09	0.09	0.36	0.36	0.49	0.49
RI test p-value	0.52		0.35		0.60	
<i>Panel B: Second Round Results</i>						
Nudge	-0.0070 (0.0621)	-0.0005 (0.0049)	0.0229 (0.0378)	0.0049 (0.0080)	0.0069 (0.0356)	0.0017 (0.0085)
Reminder	-0.0149 (0.0618)	-0.0012 (0.0048)	0.0449 (0.0377)	0.0096 (0.0080)	-0.0219 (0.0356)	-0.0052 (0.0085)
Nudge × Reminder	-0.0022 (0.0884)	-0.0291 (0.0069)	-0.0087 (0.0533)	-0.0408 (0.0114)	0.0134 (0.0504)	0.0032 (0.0120)
Observations	26,570	26,570	26,570	26,570	26,570	26,570
Mean dep. variable	0.09	0.09	0.33	0.33	0.49	0.49
RI test p-value	0.74		0.47		0.81	
College FE	Yes	Yes	Yes	Yes	Yes	Yes

*Note*—Results come from estimating equation (??) with attending social events as the dependent variable in the first two columns, visiting to the wellness and fitness center as the dependent variable in the third and fourth columns and participating in a student organization as the dependent variable in the last two columns. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Infox2, Nudge and Nudgex2). All estimations include honors status and college fixed effects. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge  $\times$  Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 7: Effect of Nudge &amp; Reminder on Attendance on Social Events

	White		Non-White		Black		Asian	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>								
Nudge	-0.0700 (0.0497)	-0.0053 (0.0038)	0.1115 (0.0976)	0.0092 (0.0080)	0.2474* (0.1452)	0.0205* (0.0120)	-0.1152 (0.1956)	-0.0094 (0.0160)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,310	1,310
Mean dep. variable	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10
RI test p-value	0.15		0.35		0.13		0.60	
<i>Panel B: Second Round Results</i>								
Nudge	-0.0588 (0.0705)	-0.0044 (0.0053)	0.1653 (0.1313)	0.0153 (0.0122)	0.2728 (0.1973)	0.0240 (0.0173)	-0.2113 (0.2678)	-0.0197 (0.0248)
Reminder	-0.0310 (0.0702)	-0.0023 (0.0053)	0.0431 (0.1314)	0.0038 (0.0116)	-0.0144 (0.2087)	-0.0011 (0.0164)	-0.0313 (0.2452)	-0.0031 (0.0243)
Nudge $\times$ Reminder	0.0296 (0.1003)	0.0022 (0.0075)	-0.2406 (0.1885)	-0.0219 (0.0170)	-0.1008 (0.2837)	-0.0096 (0.0243)	-0.1100 (0.3799)	-0.0085 (0.0340)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,305	1,305
Mean dep. variable	0.08	0.08	0.10	0.10	0.10	0.10	0.11	0.11
RI test p-value	0.79		0.21		0.73		0.78	
College FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note*— Results come from estimating equation (??) with attending social events as the dependent variable. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Infox2, Nudge and Nudgex2). All estimations include honors status and college fixed effects. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge x Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 8: Effect of Nudge &amp; Reminder on Fitness &amp; Wellness Center Visits

	White		Non-White		Black		Asian	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>								
Nudge	0.0372 (0.0288)	0.0084 (0.0065)	-0.0308 (0.0613)	-0.0065 (0.0130)	0.1096 (0.0952)	0.0212 (0.0184)	-0.1113 (0.1166)	-0.0257 (0.0269)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,310	1,310
Mean dep. variable	0.37	0.37	0.32	0.32	0.28	0.28	0.38	0.38
RI test p-value	0.19		0.61		0.26		0.34	
<i>Panel B: Second Round Results</i>								
Nudge	0.0259 (0.0417)	0.0056 (0.0089)	0.0070 (0.0894)	0.0014 (0.0181)	0.1492 (0.1437)	0.0264 (0.0254)	-0.0586 (0.1656)	-0.0136 (0.0385)
Reminder	0.0501 (0.0416)	0.0108 (0.0090)	0.0180 (0.0888)	0.0036 (0.0180)	0.0208 (0.1447)	0.0036 (0.0248)	-0.0652 (0.1633)	-0.0152 (0.0379)
Nudge × Reminder	-0.0495 (0.0589)	-0.0107 (0.0127)	0.0001 (0.1250)	0.0004 (0.0254)	-0.0153 (0.2004)	-0.0859 (0.2004)	-0.0098 (0.2332)	-0.0442 (0.0537)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,310	1,310
Mean dep. variable	0.33	0.33	0.30	0.30	0.23	0.23	0.39	0.39
RI test p-value	0.38		0.99		0.64		0.84	
College FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note*— Results come from estimating equation (??) with visiting the wellness and fitness center as the dependent variable. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Infox2, Nudge and Nudgex2). All estimations include honors status and college fixed effects. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge x Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 9: Effect of Nudge &amp; Reminder on Becoming a Member in a Student Organization

	White		Non-White		Black		Asian	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME
Panel A: First Round Results								
Nudge	-0.0042 (0.0280)	-0.0010 (0.0067)	0.0842 (0.0584)	0.0196 (0.0136)	0.1218 (0.0877)	0.0278 (0.0200)	0.1200 (0.1175)	0.0272 (0.0266)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,310	1,310
Mean dep. variable	0.50	0.50	0.43	0.43	0.42	0.42	0.44	0.44
RI test p-value	0.89		0.15		0.15		0.25	
Panel B: Second Round Results								
Nudge	-0.0138 (0.0395)	-0.0033 (0.0094)	0.0915 (0.0827)	0.0212 (0.0192)	0.1501 (0.1256)	0.0339 (0.0283)	0.1521 (0.1660)	0.0345 (0.0376)
Reminder	-0.0378 (0.0396)	-0.0090 (0.0095)	0.0420 (0.0824)	0.0097 (0.0191)	0.1577 (0.1262)	0.0356 (0.0285)	-0.0015 (0.1649)	-0.0003 (0.0371)
Nudge× Reminder	0.0192 (0.0559)	0.0046 (0.0134)	-0.0148 (0.1168)	-0.0034 (0.0272)	-0.0124 (0.1757)	-0.0567 (0.0400)	-0.0145 (0.2352)	-0.0639 (0.0532)
Observations	21,397	21,397	5,173	5,173	2,317	2,317	1,310	1,310
Mean dep. variable	0.50	0.50	0.43	0.43	0.42	0.42	0.44	0.44
RI test p-value	0.71		0.91		0.74		0.81	
College FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note*— Results come from estimating equation (??) with participating in a student organization as the dependent variable. The first column of every estimation includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Infox2, Nudge and Nudgex2). All estimations include honors status and college fixed effects. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge x Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.



Table 10: The Effect of Block Variables on All Visits

	First Round of Visits		Second Round of Visits	
	Logit	Poisson	Logit	Poisson
Female	0.0358*** (0.0029)	-0.1222 (0.1101)	0.0365*** (0.0030)	0.1325 (0.0983)
Black	-0.0185*** (0.0042)	-0.0724 (0.1949)	-0.0240*** (0.0042)	-0.1783 (0.1640)
Asian	-0.0239*** (0.0050)	0.2815 (0.3430)	-0.0166*** (0.0058)	-0.3023 (0.1984)
Hispanic	0.0023 (0.0140)	0.5126 (0.4968)	0.0254 (0.0169)	0.6920 (0.5576)
Other Race	0.0007 (0.0265)	-0.5270 (0.6471)	-0.0031 (0.0264)	0.6021 (1.2965)
Mixed Race	0.0072 (0.0051)	0.1747 (0.1483)	0.0094 (0.0073)	-0.0530 (0.1304)
Freshman	-0.0063* (0.0037)	-0.0421 (0.1316)	-0.0044 (0.0039)	-0.1890* (0.1100)
Sophomore	-0.0087** (0.0036)	-0.2106* (0.1184)	-0.0057 (0.0038)	-0.1541 (0.1089)
Junior	0.0009 (0.0038)	-0.0268 (0.1217)	-0.0019 (0.0038)	0.0437 (0.1147)
Honors	0.0244*** (0.0042)	0.0428 (0.1131)	0.0244*** (0.0043)	0.3456*** (0.1055)
Observations	26,570	1,415	26,570	1,513
Mean dependent variable	0.05	1.84	0.06	1.68
College FE	Yes	Yes	Yes	Yes

*Note*—Results come from estimating equation (??) and the effect of block variables on all visits including, counseling, psychiatry, group therapy and coaching. The first two columns include the average marginal effect of the Logit and the Poisson model for the first round of visits and the last two columns include the average marginal effect of the Logit and the Poisson model for the second round of visits. All estimations include college fixed effects. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 11: Effect of Nudge &amp; Reminder on All Visits

	Logit		Poisson		Logit		Poisson	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME
Panel A: First Round Results								
Nudge	-0.0028 (0.0549)	-0.0001 (0.0028)	-0.0073 (0.0673)	-0.0101 (0.0925)	-0.0004 (0.0549)	-0.0001 (0.0028)	-0.0094 (0.0674)	-0.0129 (0.0925)
Observations	26,570	26,570	1,415	1,415	26,570	26,570	1,415	1,415
Mean dependent variable	0.05	0.05	1.84	1.84	0.05	0.05	1.84	1.84
RI test p-value	0.96		0.91		0.99		0.88	
Panel B: Second Round Results								
Nudge	0.0515 (0.0763)	0.0027 (0.0040)	-0.2453** (0.1119)	-0.2837** (0.1277)	0.0489 (0.0764)	0.0025 (0.0040)	-0.2455** (0.1121)	-0.2829** (0.1274)
Reminder	0.0370 (0.0762)	0.0019 (0.0039)	-0.2059** (0.1037)	-0.2427** (0.1224)	0.0326 (0.0764)	0.0017 (0.0039)	-0.2067** (0.1036)	-0.2427** (0.1219)
Nudge × Reminder	0.0511 (0.1064)	0.0030 (0.0060)	0.3579** (0.1526)	0.4103** (0.1729)	0.0606 (0.1065)	0.0035 (0.0057)	0.3668** (0.1525)	0.4192** (0.1724)
Observations	26,570	26,570	1,513	1,513	26,570	26,570	1,513	1,513
Mean dependent variable	0.06	0.06	1.68	1.68	0.06	0.06	1.68	1.68
RI test p-value	0.61		0.0		0.56		0.01	
College FE	No	No	No	No	Yes	Yes	Yes	Yes

*Note*—Results come from estimating equation (??) with all visits including, counseling, psychiatry, group therapy and coaching, as the dependent variable. The first column of every model includes the coefficient estimates (Est.) and the second the average marginal effects (AME). Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Info, Infox2, Nudge and Nudgex2). All estimations control for honors status. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge  $\times$  Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.

Table 12: Effect of Nudge &amp; Reminder on All Visits by Race

	White				Non-White		Black		Asian	
	Logit		Poisson		Logit		Logit		Logit	
	Est.	AME	Est.	AME	Est.	AME	Est.	AME	Est.	AME
<i>Panel A: First Round Results</i>										
Nudge	-0.0460 (0.0614)	-0.0024 (0.0032)	-0.0570 (0.0766)	-0.0768 (0.1033)	0.1773 (0.1235)	0.0079 (0.0055)	0.5888** (0.2294)	0.0208*** (0.0080)	0.6102* (0.3437)	0.0209* (0.0116)
Observations	21,397	21,397	1,193	1,193	5,173	5,173	2,317	2,317	1,139	1,139
Mean dependent variable	0.06	0.06	1.83	1.83	0.04	0.04	0.04	0.04	0.04	0.04
RI test p-value	0.51		0.47		0.14		0.02		0.12	
<i>Panel B: Second Round Results</i>										
Nudge	-0.0340 (0.0866)	-0.0018 (0.0045)	-0.2563** (0.1209)	-0.2889** (0.1366)	0.2352 (0.1862)	0.0109 (0.0086)	0.0578 (0.3251)	0.0020 (0.0112)	0.0713 (0.4016)	0.0030 (0.0170)
Reminder	0.0379 (0.0852)	0.0020 (0.0046)	-0.1938* (0.1162)	-0.2251* (0.1359)	-0.0808 (0.1958)	-0.0032 (0.0078)	-0.2850 (0.3471)	-0.0084 (0.0102)	-0.2111 (0.4207)	-0.0079 (0.0157)
Nudge × Reminder	0.1392 (0.1197)	0.0078 (0.0065)	0.4276*** (0.1655)	0.4856*** (0.1885)	0.0130 (0.2674)	-0.0001 (0.0120)	0.5077 (0.4657)	0.0171 (0.0158)	0.0215 (0.5820)	0.0003 (0.0226)
Observations	21,397	21,397	1,268	1,268	5,173	5,173	2,317	2,317	1,310	1,310
Mean dependent variable	0.06	0.06	1.68	1.68	0.05	0.05	0.04	0.04	0.04	0.04
RI test p-value	0.51		0.01		0.96		0.41		0.99	
College FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Note*—Results come from estimating equation (??) with all visits including, counseling, psychiatry, group therapy and coaching, as the dependent variable. The first column of every model includes the coefficient estimates (Est.) and the second the average marginal effects (AME). For White students the sample size allows for the estimation of the Logit and the Poisson model. For non-White, Black and Asian students, sample size allows for the estimation of the Logit model only. Each observation is weighted by the inverse of the proportion of subjects in its block that are assigned to a certain group (Control, Control x 2, Nudge and Nudge x 2). All estimations control for honors status. On panel A, the “RI test p-value” row includes the p-values of the “Nudge” estimated using randomization inference. On panel B, the “RI test p-value” row includes the p-values of the “Nudge x Reminder” estimated using randomization inference. Robust standard errors are in parentheses. \*, \*\*, \*\*\* denotes significant at 10, 5, and 1 percent, respectively.